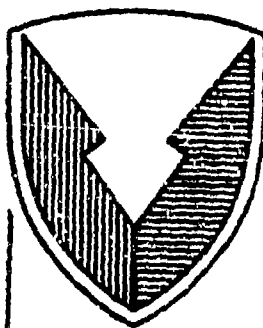


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C E N T E R



Technical Report

TACOM-TR-
No. 13256

POLYURETHANE FOAM PACK OUTDOOR STORAGE TEST

OCTOBER 1987

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By

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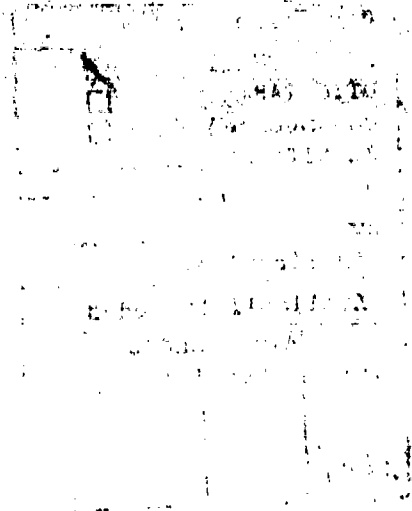


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1.0. INTRODUCTION

This final report, prepared by the U.S. Army Tank-Automotive Command (TACOM), Engineering Data Directorate, Technical Data Division, Packaging Branch, is an evaluation of TACOM's polyurethane foam packaging capability in providing Level A, water vapor protection to a major assembly. The test included an assessment of the MIL-STD-129, Level A marking requirements applied to a fiberboard surface and exposed to the outdoor environment.

One of two large-item, total-encapsulation, polyurethane foam pack designs used at TACOM includes a top which consists of polyurethane along with a wood frame. This polyurethane foam pack, when properly produced, was designed to not allow water penetration. However, there have been sporadic reports, over the past 10 years, of water penetration taking place when the packs are stored outside exposed to the elements. For this reason, the test described in this report was conducted.

The polyurethane foam used in our designs conforms to MIL-F-83671, Class I, Category II, 2 lbs/cu ft density, with tensile strength, moisture vapor permeability, and oil-resistant properties specified. This specification replaced MIL-P-21929, Class 1, polyurethane foam.

2.0. OBJECTIVE

The primary objective of this environmental test was to evaluate the ability of the total-encapsulation polyurethane foam packaging to provide (Level A) protection to a major assembly over an extended outdoor storage period when packaged to TACOM requirements.

3.0. CONCLUSIONS

The addition of a plywood top and a change in the design of the top frame improves the quality of the polyurethane foam pack. The new design provides greater strength, improved reliability, and reduces the probability of water penetration to the item if the polyurethane foam barrier is damaged.

The use of labels on the fiberboard is unacceptable because the labels do not adhere to the fiberboard for any extended period when exposed to the elements.

The total encapsulation polyurethane foam pack meets all the requirements for Level A protection needed to protect TACOM parts against the most severe worldwide shipment, handling, and storage conditions.

4.0. RECOMMENDATIONS

All polyurethane foam-in-place (FIP) packaging data sheets that call for the wood frame top with foam exposed to the elements should be updated to incorporate a plywood top cover with a redesigned frame.

The Army Materiel Command (AMC) should establish a new method of protection for inclusion in MIL-P-116, polyurethane foam, total-encapsulation, technique VII of MIL-F-45216.

All special markings shall be limited to stenciling, printing, or silk screening per MIL-STD-129.

5.0. DISCUSSION

5.1. Background

In June 1983, it was decided to conduct an extended outdoor storage test of one metal and two polyurethane packs containing 6V53 engines to assess TACOM's polyurethane foam packaging capability in providing Level A, water vapor protection. The condition of these engines over the period of the test was to be used in appraising the adequateness of the polyurethane FIP pack as a Level A pack.

The test was initiated because over the last 10 years we have experienced several deficiency reports on FIP packs. Our extensive investigation of deficiencies in the total-encapsulation polyurethane foam pack revealed that discrepancies were caused by rare occurrences such as:

- Foam Properties not meeting specification requirements
 - No low/high temperature stabilizers
 - Low compressive strength
 - Low density
 - Open cell content greater than 10 percent
 - Poor tensile strength
 - Friability
- Foam Packaging Workmanship not meeting specification requirements
 - Small void openings (pockets) on the top of the pack where water accumulates, freezes, melts, etc., result in expansion, which causes the foam cells to crack and causes water to seep down into the pack.
 - Poor knit lines between successive pours (with occlusions, cracks, and separations) result in additional cracks and causes water to seep into the pack.
 - Small (pin) holes in the top, which open like a funnel down to the item in the pack, also result in water

seepage into the pack. These pin holes are normally caused by inadequate filling of the container, or an attempt to pour too much foam at one time.

- Handling and Storage

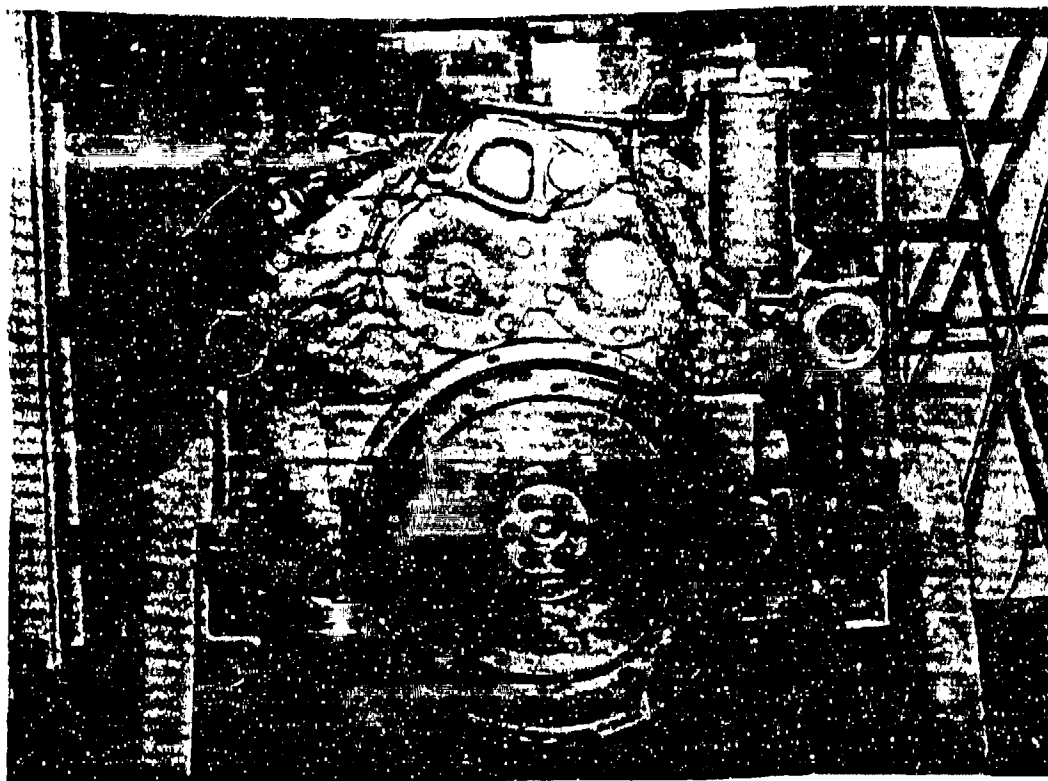
- Personnel open the pack for inspection and then try to reseal the foam pack for storage. Resealing a pack that has been opened is almost never successful and is not considered acceptable.
- Personnel probe the foam with pencils, pens, knives, etc.
- Personnel drive a forklift's tines into the side of the pack. This is a hazard of all packs, even metal containers.

The intent of our test program was to assess whether, when specification polyurethane foam is used, and when correct procedures are followed for the packaging of supplies using the FIP, total-encapsulation technique, the preservation and packing will protect the items encapsulated against direct exposure to extremes of climate, terrain, operational transportation environments without protection other than that provided by the pack. One additional purpose of the test was to determine if there would be any benefits to be derived from adding a protective cover to the open polyurethane top currently in use. We wanted to assess the cost benefit of increasing the protection to neutralize some of the discrepancies that had been identified.

The study began with the selection of three engines: Marine Engine, serial no. (S/N) 5121113, Military Engine, S/N 5135029-30, and Commercial Engine, S/N 5135029-114.

Marine engine S/N 5121113 was placed in a reusable metal container (controlled breather). See Figures 5-1 through 5-3. This metal container was used as a control and the humidity indicator, standard in this type of package, was monitored. Two other 6V53 engines, commercial engine S/N 5135029-14 (Figures 5-4 through 5-6) and military engine S/N 5135029-20 (Figures 5-7 through 5-10), were packed in polyurethane foam using requirements on Packaging Data Sheet PN 8738127 (see Addendum).

All three engines are condition Code F material. No internal preservation was provided. The rocker arm shaft under the valve covers was cleaned with emery cloth and wiped with a clean cloth. The right shaft was coated with preservative MIL-L-21260, grade PE10-1, and the left side was coated with MIL-P-46002. The flywheels were cleaned with emery cloth and wiped with a clean cloth. One-third of the flywheel area was coated with preservative MIL-L-21260, grade PE10-1, one-third was coated with preservative MIL-P-46002, and the remaining third was left unpreserved. The three segments were separated with tape.

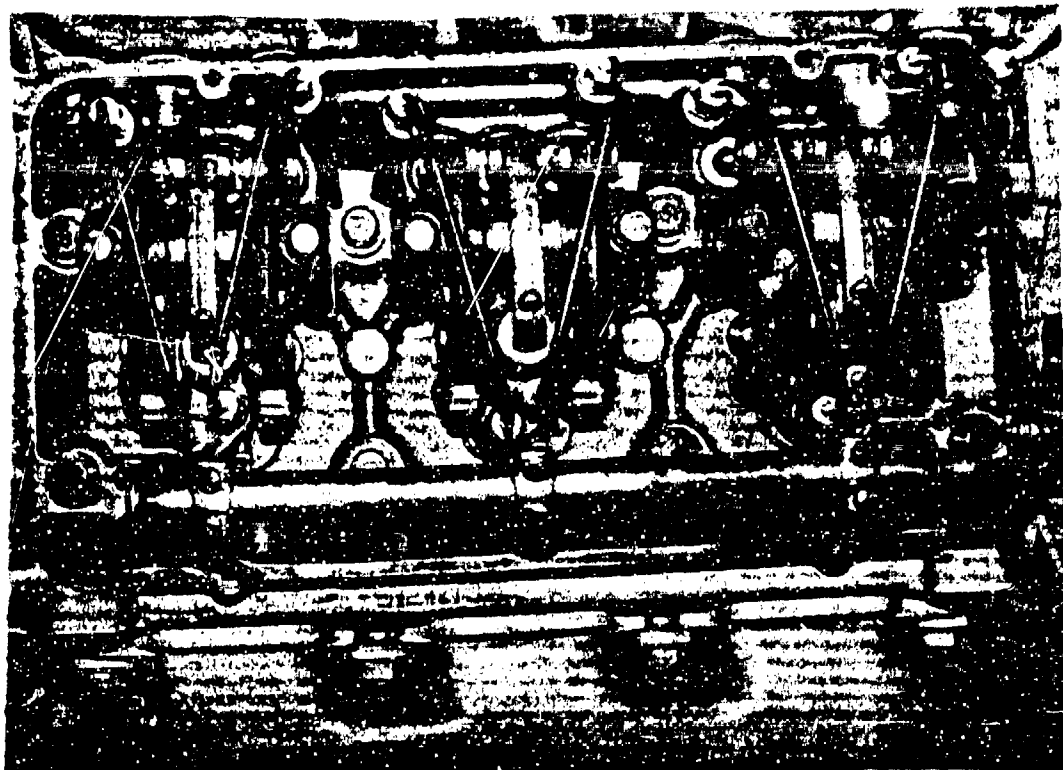


(a) Flywheel End

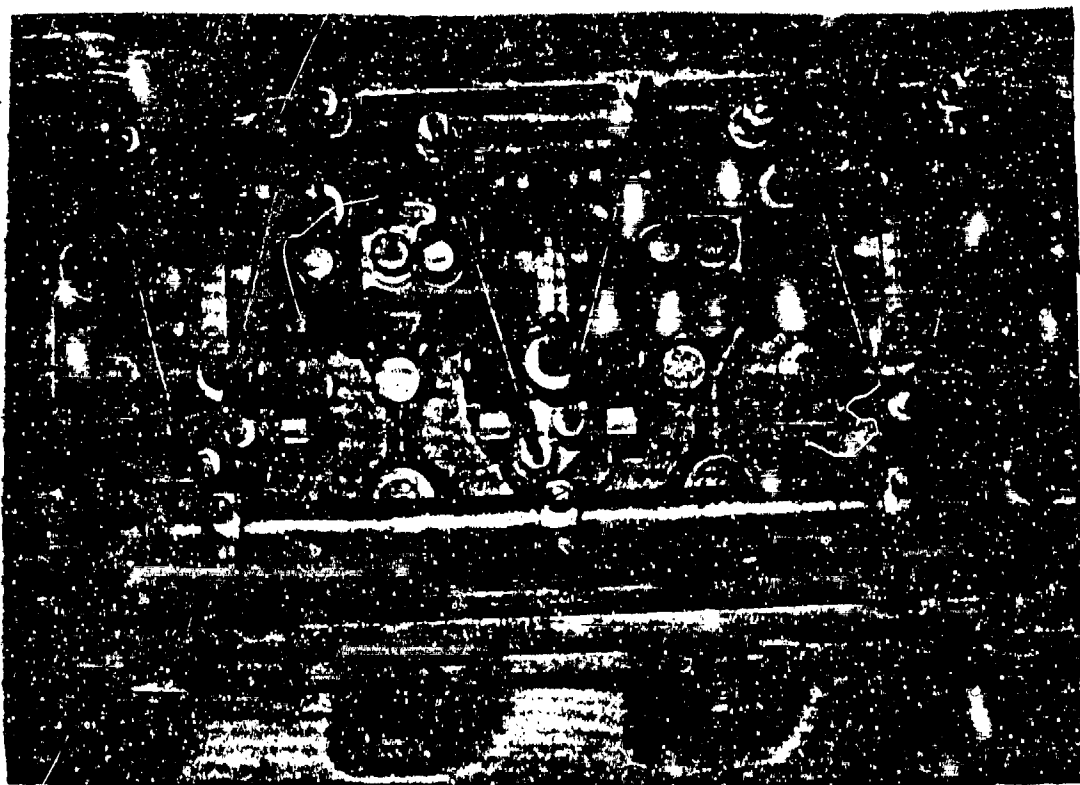


(b) Opposite End

Figure 5-1. Marine Engine 5121113

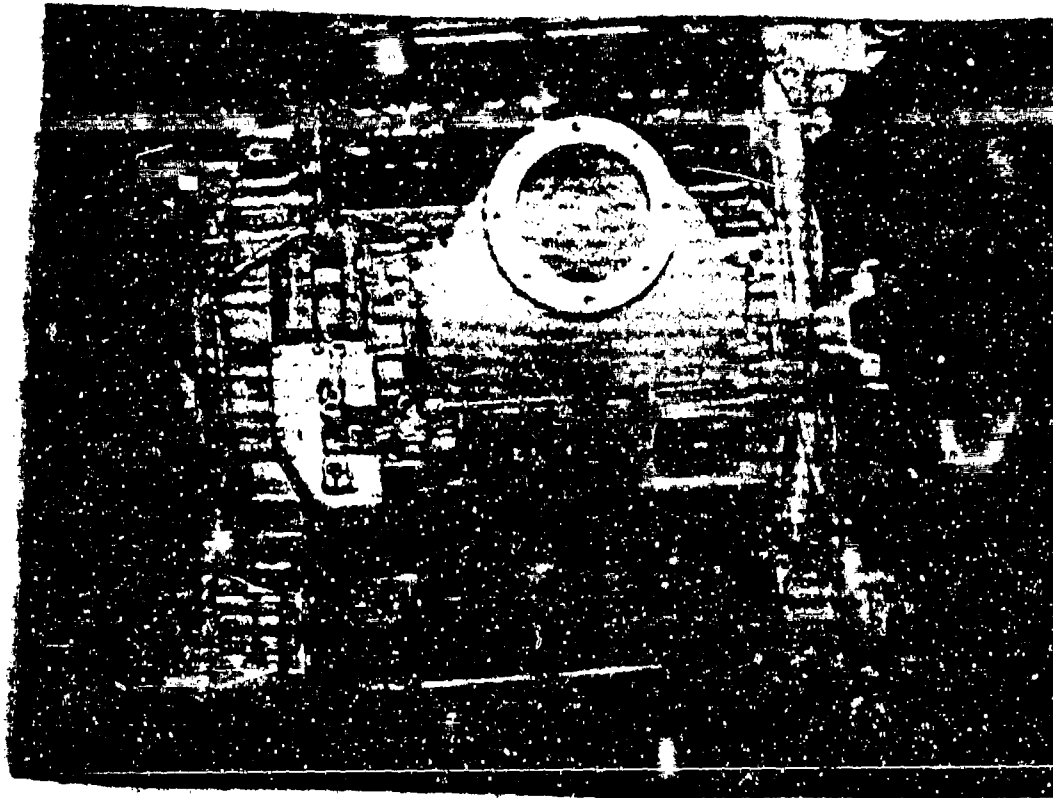


(a) Left Bank



(b) Right Bank

Figure 5-2. Marine Engine



(a) Top

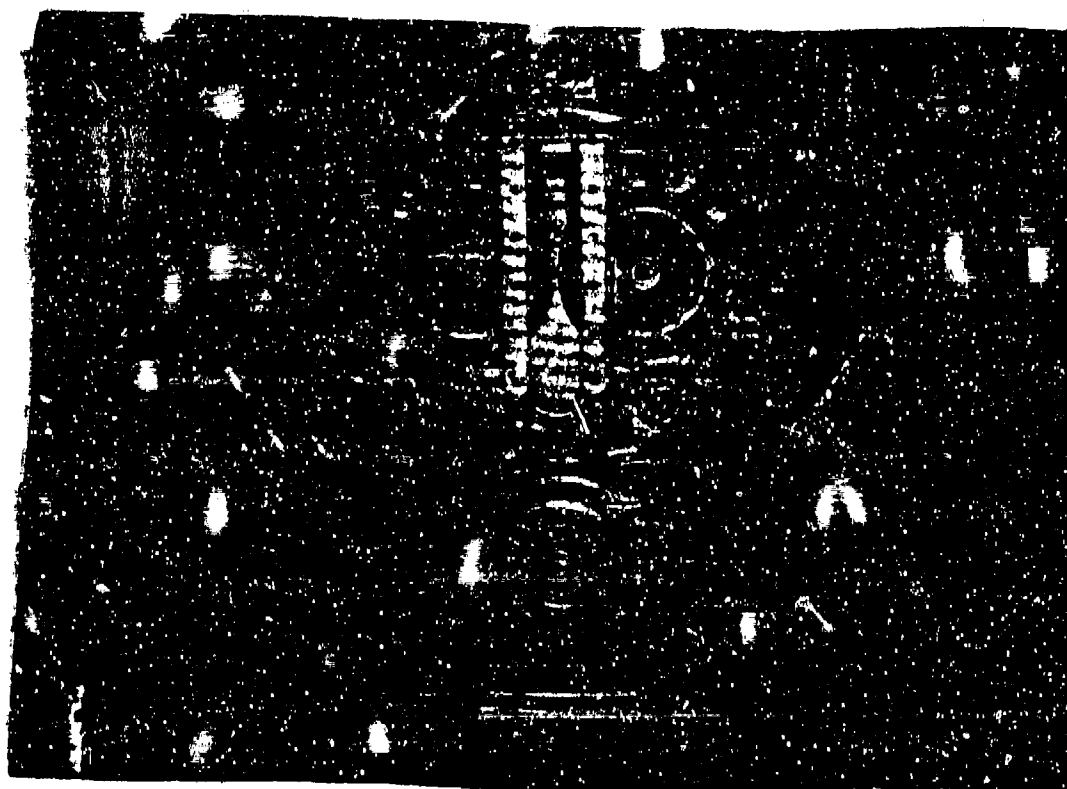


(b) Bottom

Figure 5-3. Views of Marine Engine

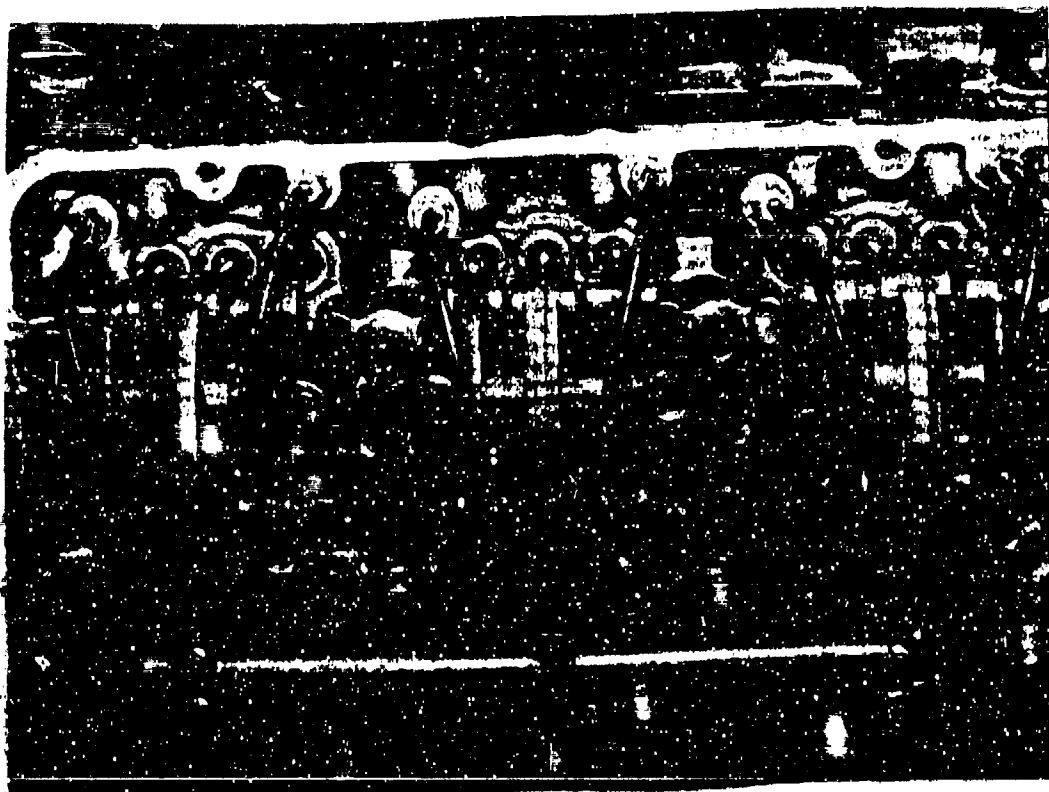


(a) Flywheel End

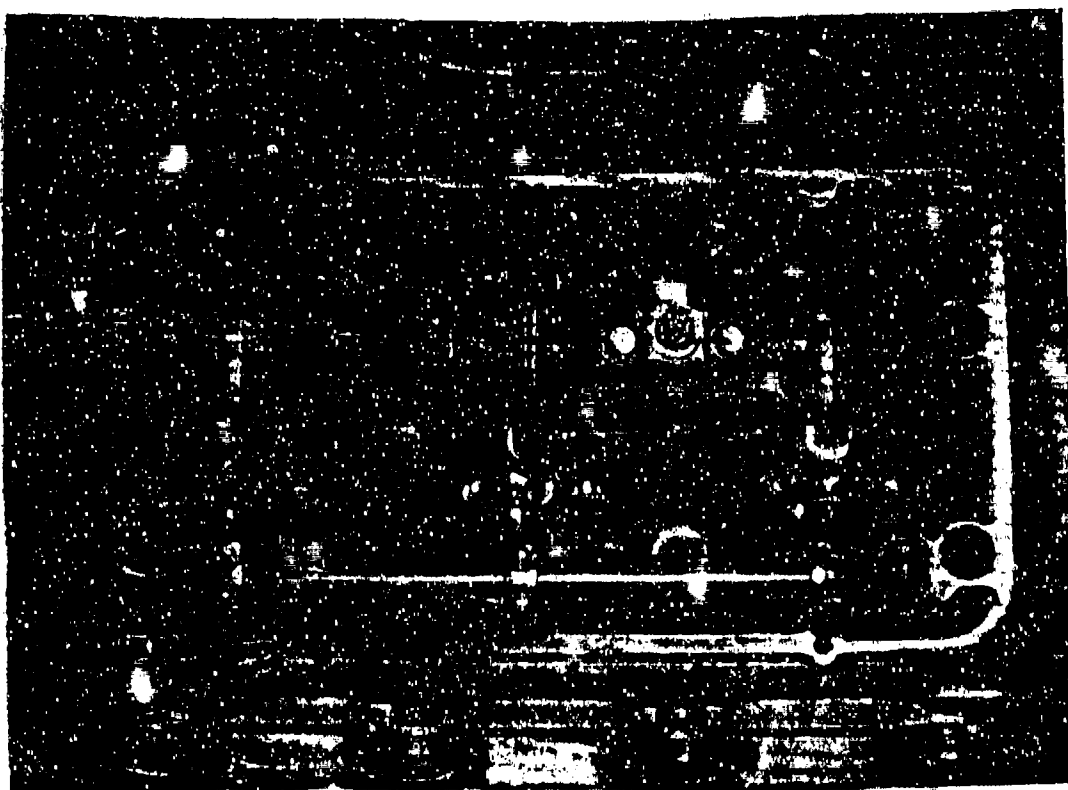


(b) Opposite End

Figure 5-4. Commercial Engine 5135029-14

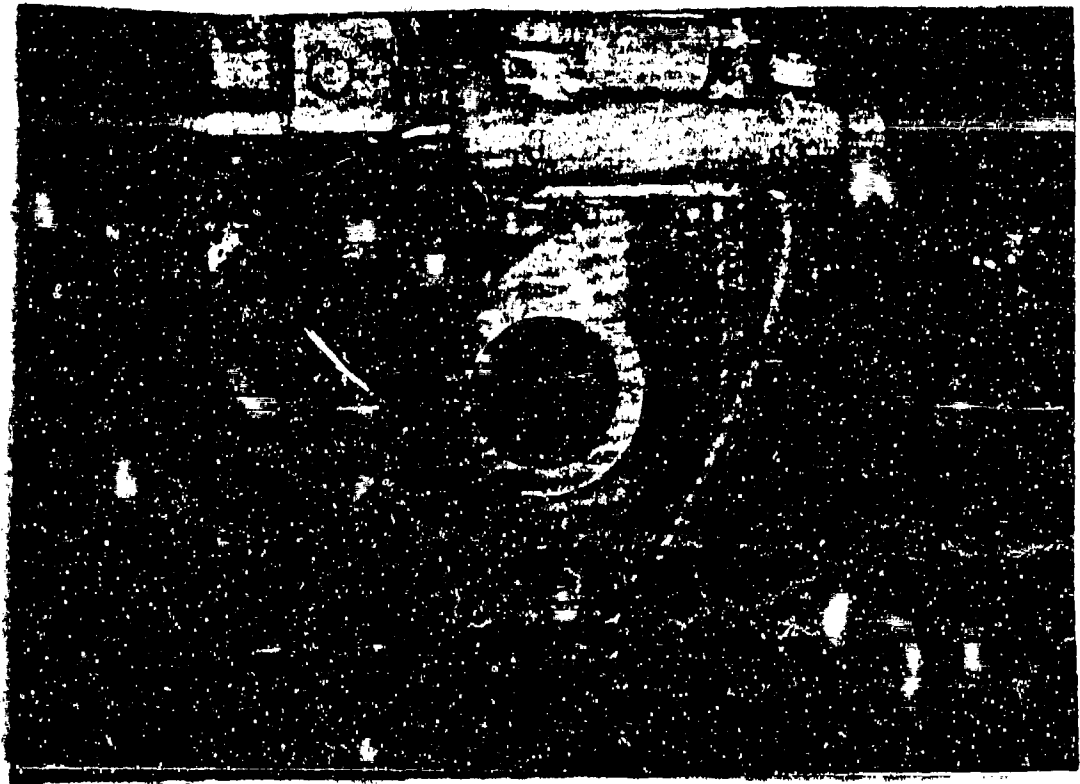


(a) Left Bank

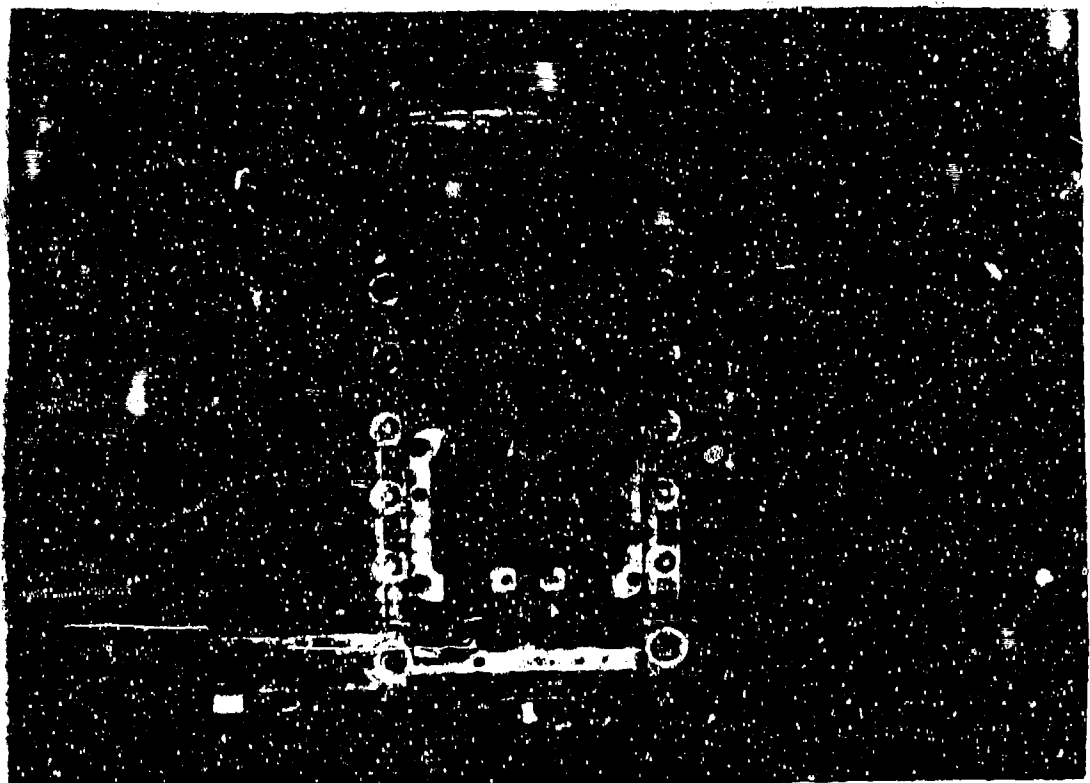


(b) Right Bank

Figure 5-5. Commercial Engine



(a) Top



(b) Bottom

Figure 5-6. Commercial Engine



Figure 5-7. Military Engine Serial No. 5135029-20

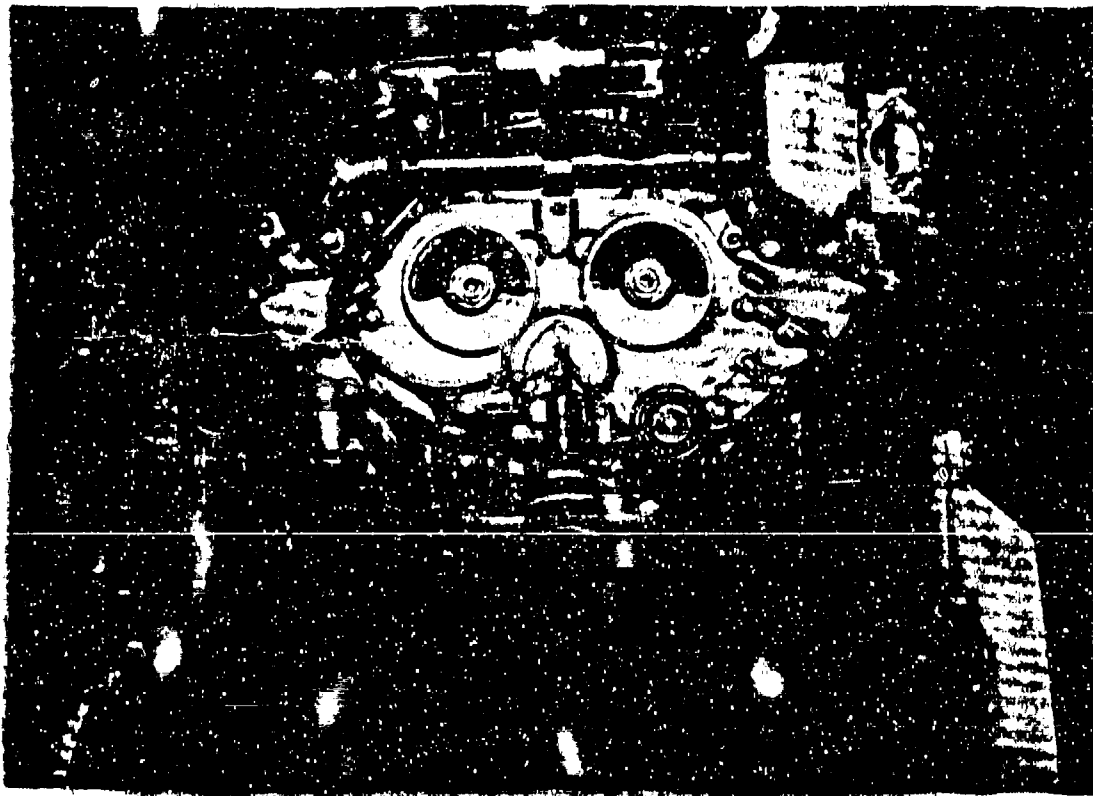
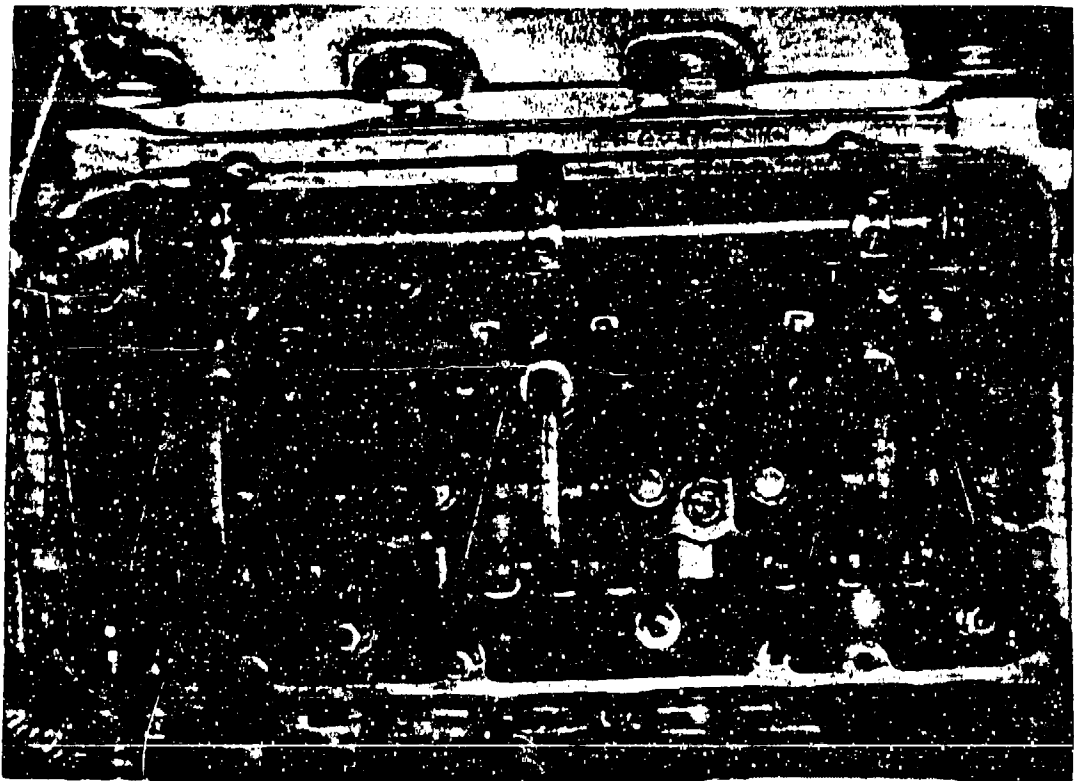
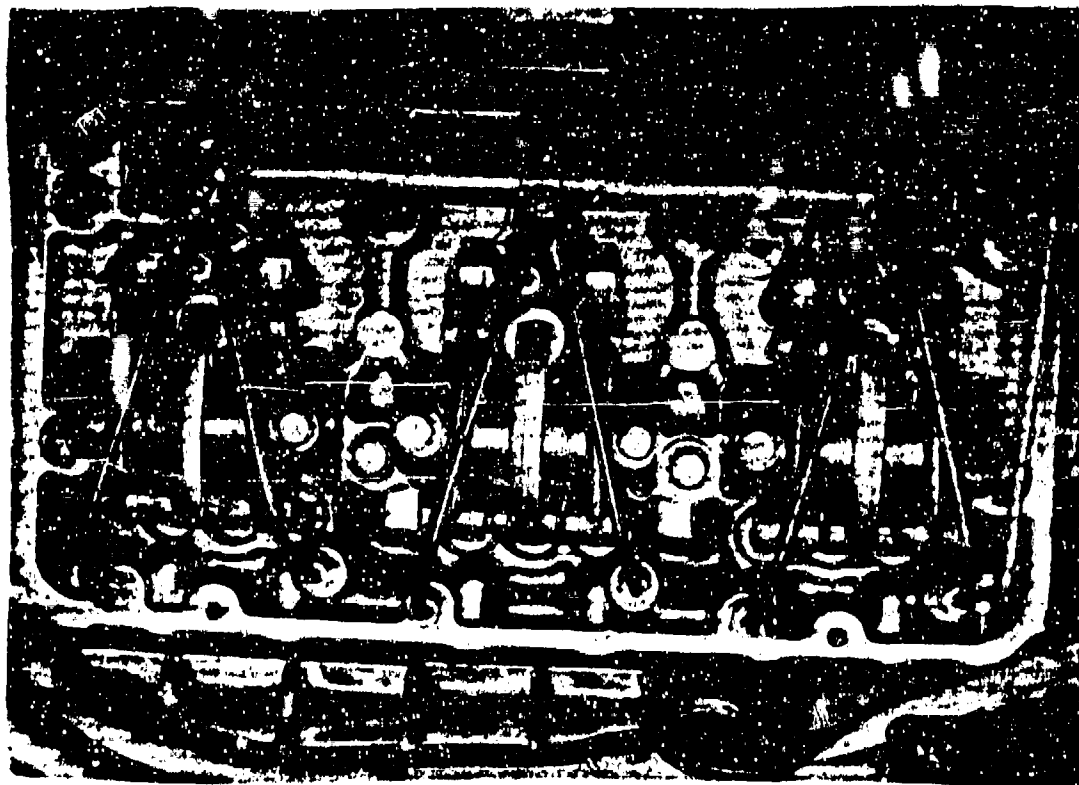


Figure 5-8. Military Engine Serial No. 5135029-20

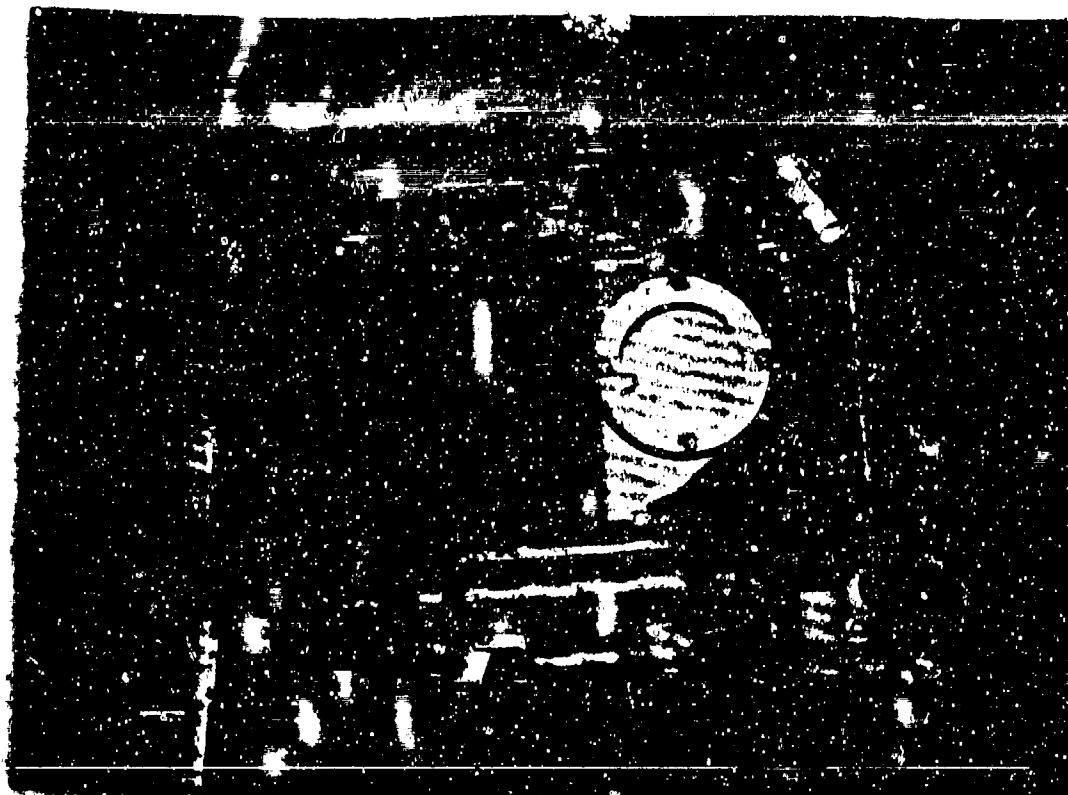


(a) Left Bank

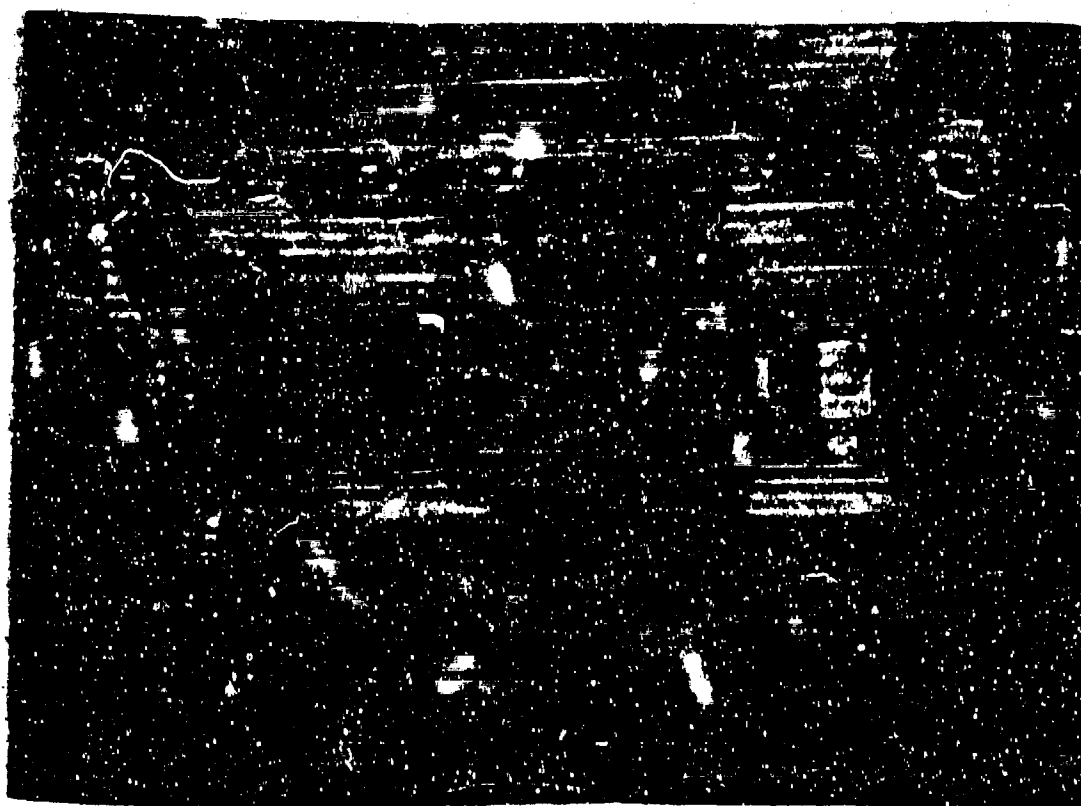


(b) Right Bank

Figure 5-9. Military Engine



(a) Top View



(b) Bottom View

Figure 5-10. Military Engine

Engine S/N 5135029-14 was packed on 5 Sep 83 and was covered with a piece of 3/8-inch plywood, grade AC, with exterior glue in accordance with federal specification NN-P-530. Plywood was nailed to the 1- by 4-inch top frame with 4D, 1 1/2-inch long, bright, flat-head, smooth-shank, box nails, type II, style 42 of FF-N-105.

Engine S/N 5135029-20 was packed the following day and the bare top polyurethane foam was partially coated. Approximately one-fourth of the top foam was coated with a one-part-polyurethane paint conforming to military specification MIL-C-83286 (a dark grey paint), and another one-fourth was coated with a two-part-polyurethane paint conforming to military specification MIL-C-81773 (a light grey paint). The remaining half of the open top was left exposed to the elements.

Two standard FIP instruction labels were glued to the fiberboard shells. A stencil of the instructions was also placed on the shells. Both of the FIP standard instruction labels and one-half the stenciling were coated with sodium silicate solution (0-S-605).

5.2. Testing of the Labels

A spin-off study was also conducted on our marking requirements because depots were complaining that all the reusability and opening instruction labels on the FIP packs were falling off. We wanted to know why. The test consisted of two standard paper labels coated with sodium silicate, two plastic labels and two ink stencils of the special marking requirements—one coated with sodium silicate and one uncoated.

All three packs were placed outside at TACOM on 7 Sep 83. One week later, the packs' labels were examined. By this time, one paper label was already loose. The sodium silicate coating turned from clear to milky white.

On 21 Sep 83, both top FIP instruction labels were gone, one-half of each of the paper labels was gone and the plastic labels were coming loose at the edges. One week after that, one FIP lower instruction label was one-quarter off. The sodium silicate coating was cracked and flaking off of all the areas where it was applied. It appeared that the coating was trapping moisture on each label and stencil, causing more deterioration of the labels and the stencils, rather than protecting them.

At the end of a month outside, the lower FIP instruction label had blown off and both paper labels were three-quarters loose. The plastic labels were three-quarters loose and the nails were pulling loose on the plywood top. Both fiberboard shells had started to bleach from the sun exposure.

On 9 Nov 83, only one paper label (one-fourth adhered), one FIP instruction label (one-third adhered), and one plastic label remained. The marking requirements that were stenciled directly to the fiberboard without protective coating fared the best.

5.3. Fabrication of Alternate Tops

In May 84, it was decided to fabricate two alternate tops and frames for the FIP packs. [The previous November, when the packs were checked, the top plywood had shown weathering and warping. The painted coatings on the foam appeared to have provided no visible improvement over the bare foam (see Figure 5-11). The humidity indicator on the metal container had stayed blue, which meant the humidity inside the container stayed below 40 percent. On 14 Dec 83, the three packs were rotated 90°. The fiberboard continued a slow bleaching. The plywood top continued to warp and more nails pulled loose as shown in Figure 5-12.]

The fabrication of the two alternate tops involved foaming two new, smaller packs, 36 inches by 36 inches by 6 inches. One had a 2- by 4-inch nominal frame, and the other had a 2- by 2-inch nominal frame, with boards nailed to the edges of the top of the frame. This type of construction left a large open area in the middle top of the pack. During the pouring of the polyurethane into the box it was obvious that it was going to be easier to fill the voids under the 2- by 2-inch nominal frame, due to the large opening in the center of the pack and the smaller area covered by the wood in the corners.

The frames consisted of two boards, 35 3/4 inches long, and two boards, 32 3/4 inches long, nailed to the inside of the fiberboard shell as illustrated in Figure 5-13. A 3/8-inch-thick plywood top was then nailed to the frames, on one pack with 2-inch-long nails from an automatic nailer, and on the other with 1 7/8-inch, 6d, chemical-etched nails. Nails were in a staggered pattern, 3 inches apart in alternate rows, 6 inches apart in each row on one pack; 6 inches apart and staggered on the other pack. Both packs were put outside on 18 May 84.

5.4. Pack Humidity Test

On 31 May 84, pictures were taken of original polyurethane packs outside (Figure 5-14). The pack with the plywood on top (containing engine S/N 5135029-14) was brought inside to see if by drilling a hole in the pack through the side we could read the temperature and relative humidity inside the pack. The results were a complete failure. It appeared that the lack of air circulation within the pack prevented any type of accurate readings with a probe that went 5 inches into the pack. The pack was then opened, examined, and the engine was removed and inspected. (See Figures 5-15 through 5-18.)

5.5. Engine Repack

The pack containing engine S/N 5135029-14 was refoamed on 22 Aug 84 without any representation of the engine, because there was no corrosion visible on the engine. The plywood top was secured by a bond which formed between the polyurethane foam and the plywood. No nails were used to secure the top. It was impossible to tell if the pack was completely filled with foam. The pack was placed outside on 23 Aug 84.

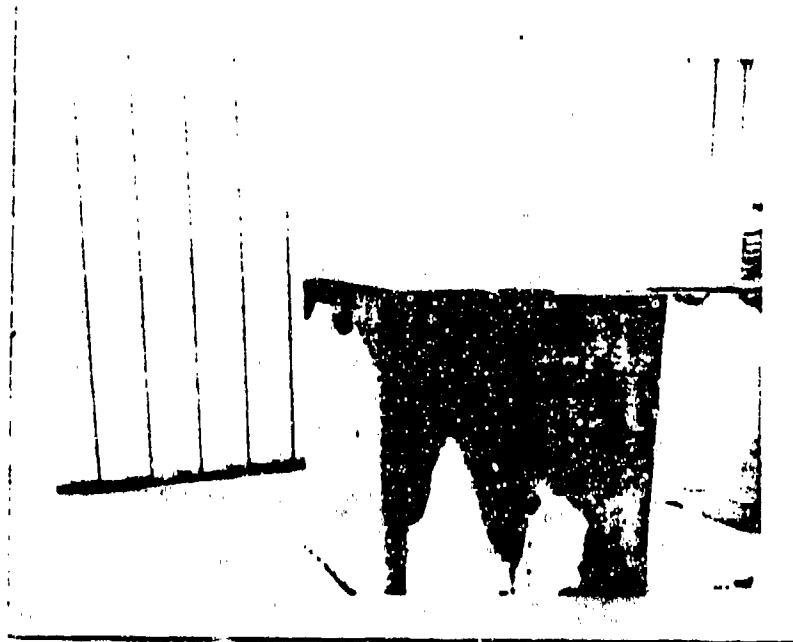


(a) Painted Top

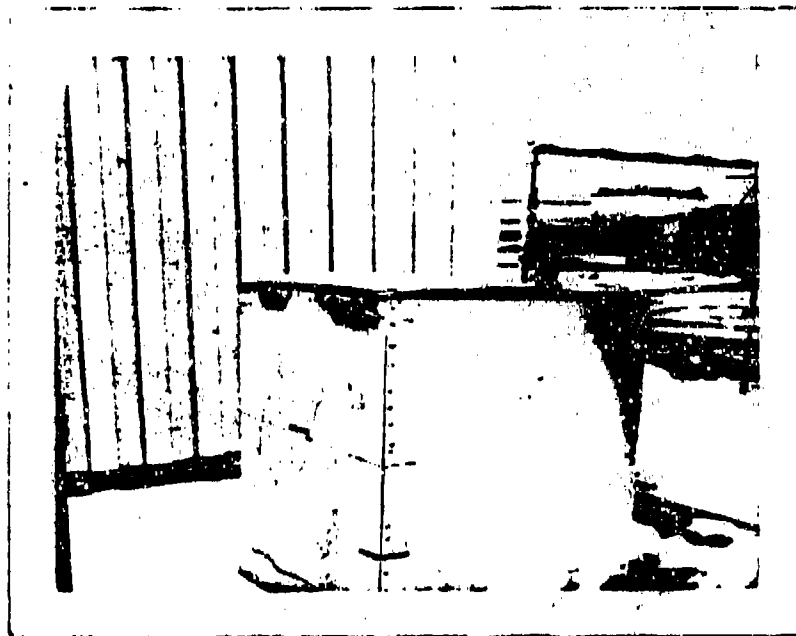


(b) Plywood Top

Figure 5-11. Closeup of Weathering Packs

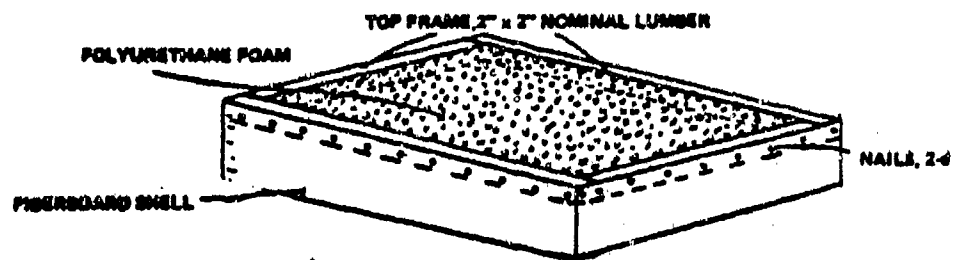


(a) Without Top

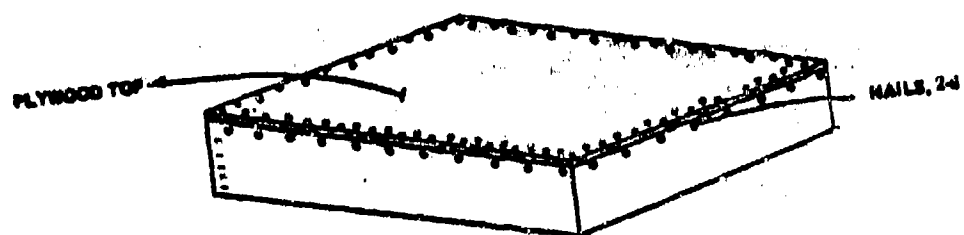


(b) With Top

Figure 5-12. Outdoor Weathered Packs

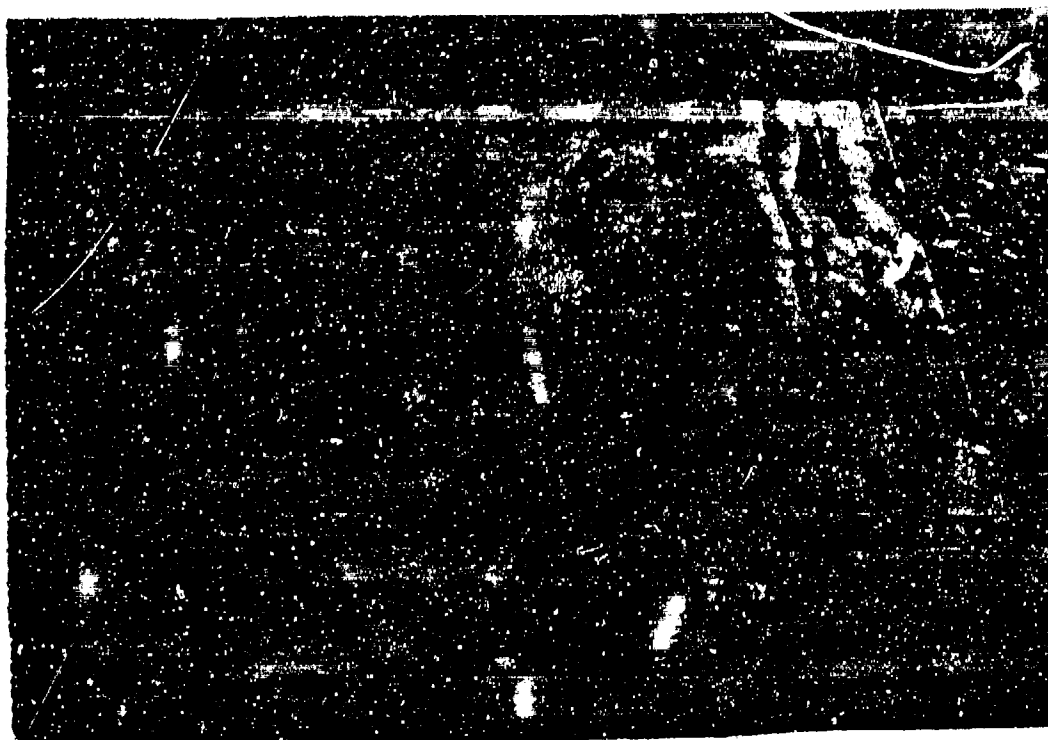


(a) Inner Frame

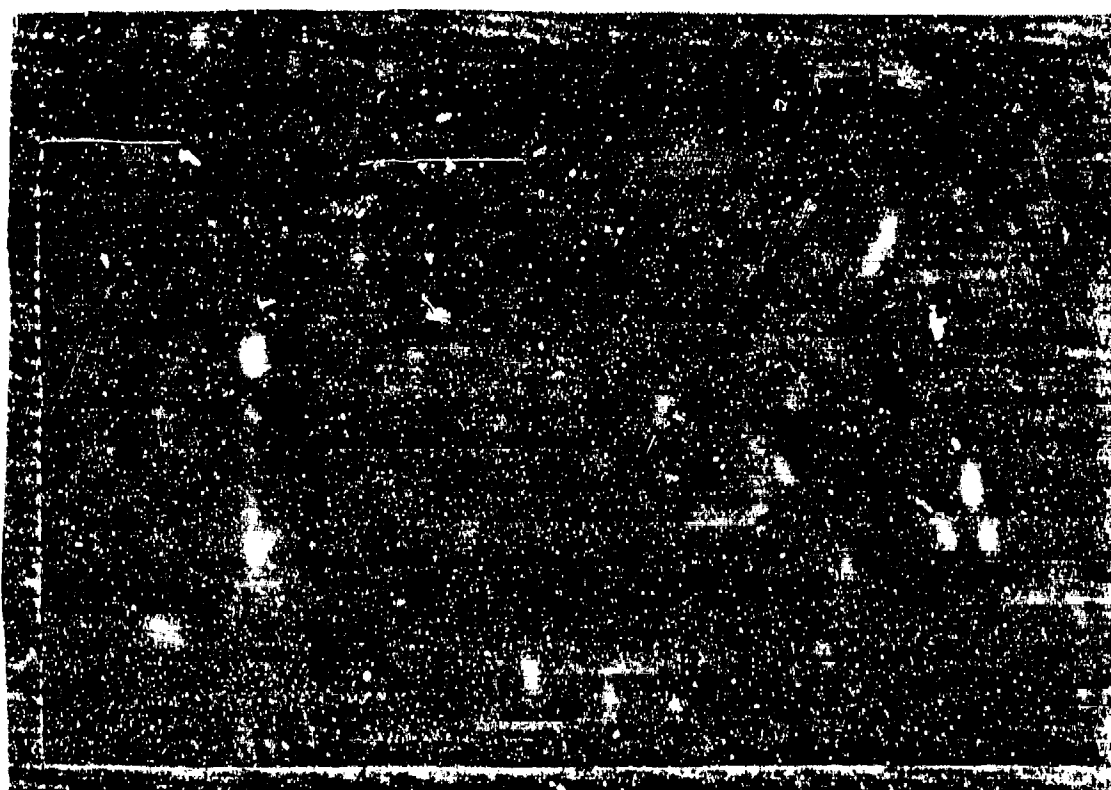


(b) Plywood Nailed to Inner Frame

Figure 5-13. Alternate Plywood Top Design



(a) Alternate Top Design



(b) Engine Packs

Figure 5-14. May 1984, Outdoor Weathered Packs

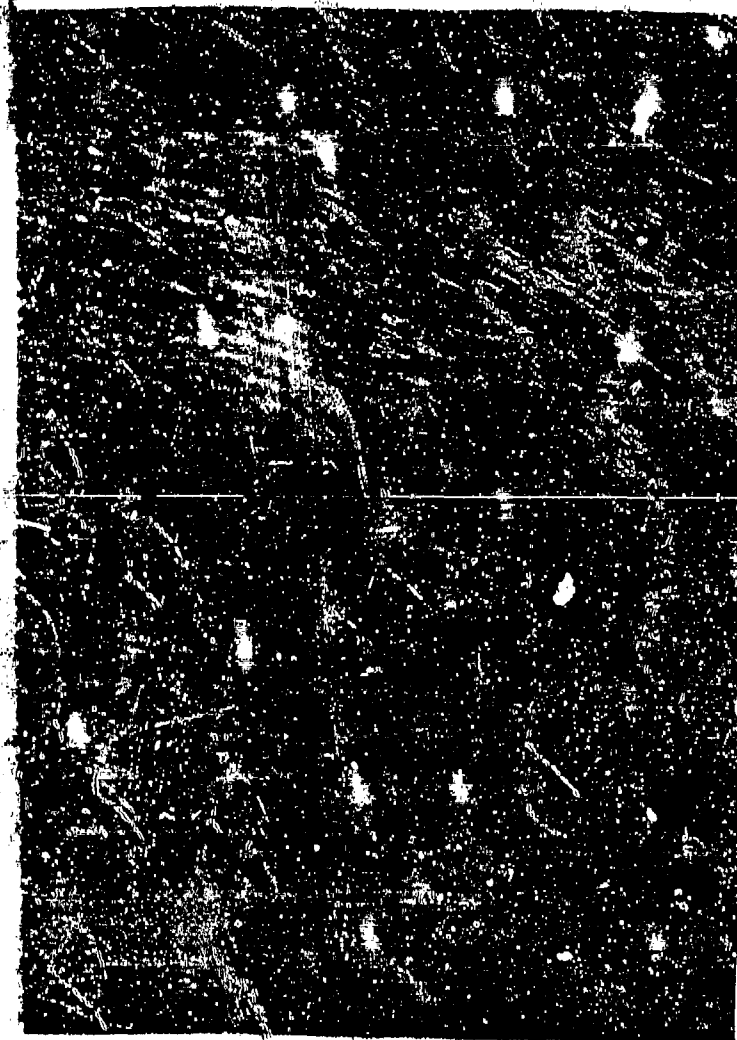


Figure 5-15. Commercial Engine Pack Opened May 1964



Figure 5-16. Commercial Engine Being Removed from Pack

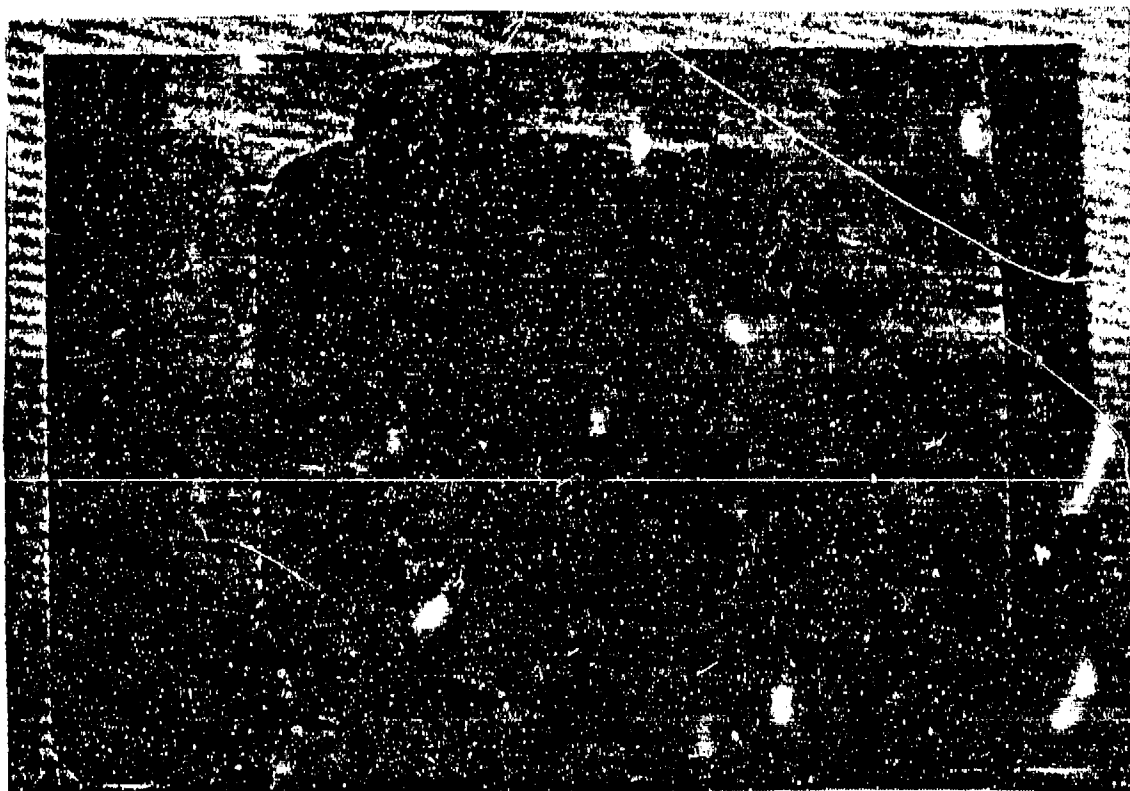
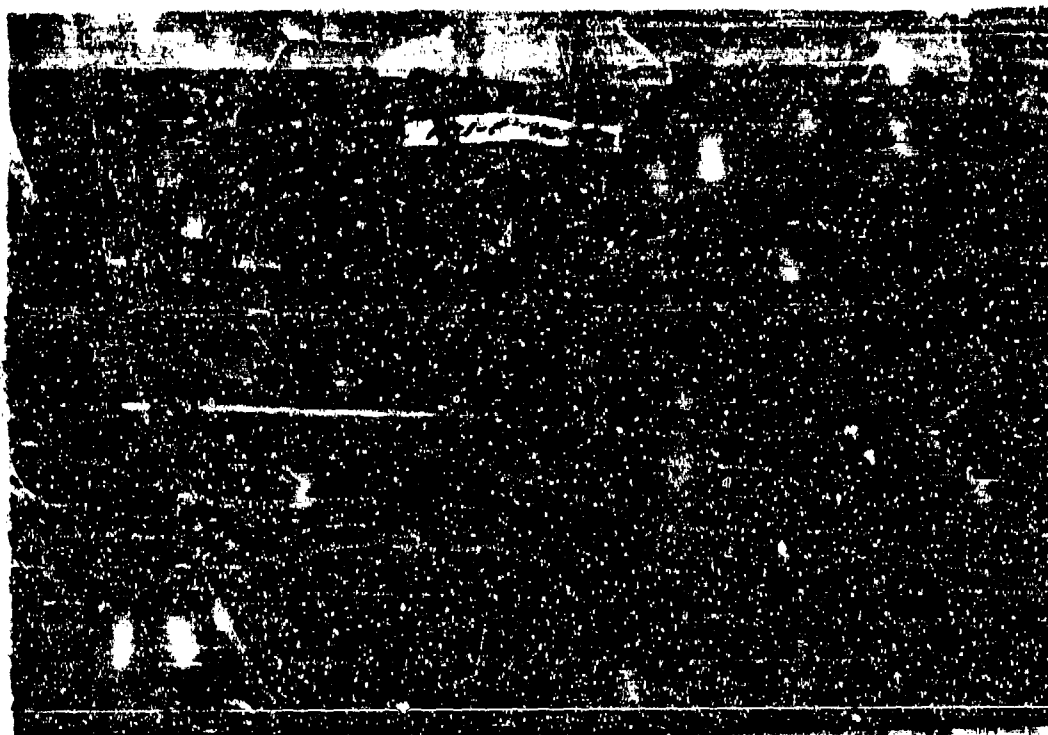
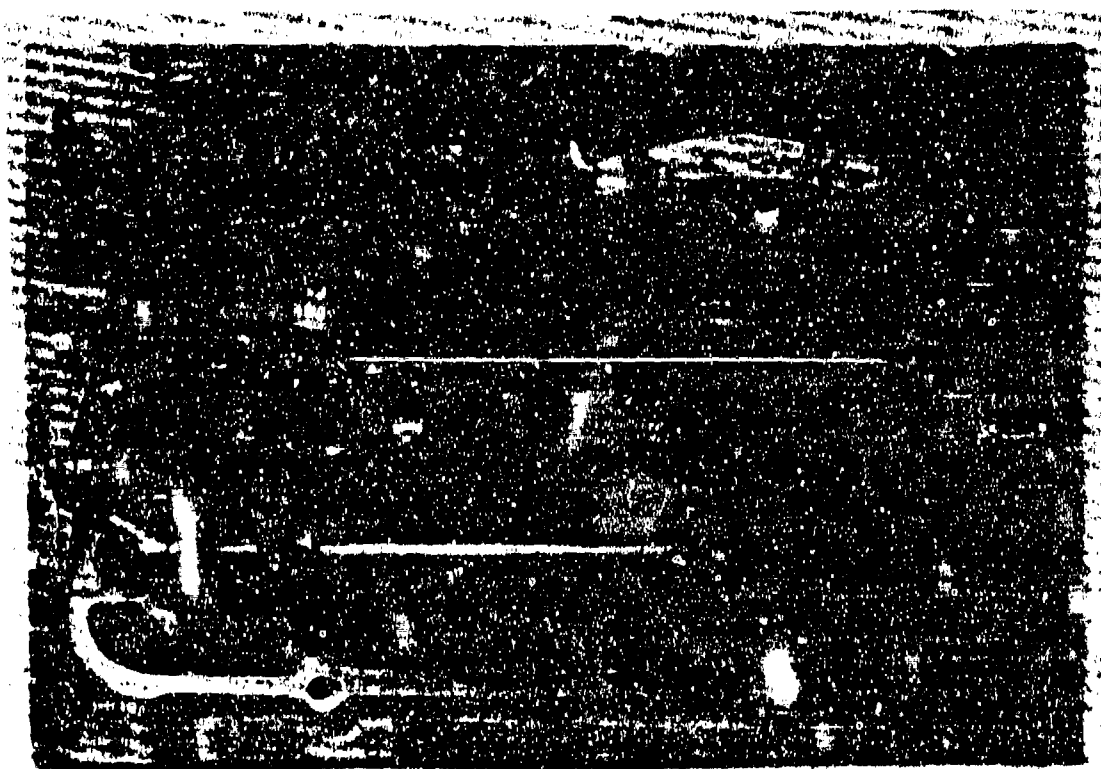


Figure 5-17. Top Half of Pack--Inside View



(a) Left Bank



(b) Right Bank

Figure 5-18. Commercial Engine in May 1984

During the next months the packs were watched closely with no significant problems noted other than the plywood top of the pack containing engine S/N 5135029-14, which was slowly pulling away from the polyurethane until a wind storm in May 85 blew the top off. The pack was brought inside and inspected for external damage. It was noted that there were no visible voids in the polyurethane on the top and the same piece of plywood was put back on the pack and secured in place with two metal bands (see Figure 5-19). The pack was placed outside the same day.

In Sep 85 the packs were rotated 180° and it was noted that the fiberboard on the one pack that had been outside for 2 years (the pack containing engine S/N 5135029-20) had started to delaminate in one place.

5.6. FIP Pack Evaluation

Both of the larger FIP polyurethane foam packs were moved inside on 8 Apr 86 and examined. There was a considerable amount of delamination of the fiberboard on one side of the oldest pack (see Figure 5-20). There was also a puncture in the side of this pack; something heavy had been dropped on top of the pack, breaking the 1- by 4-inch top frame and crushing some of the foam (see Figure 5-21 and 5-22). The cause of this damage is uncertain, but it may have been due to a garbage truck.

The other pack, which contained engine S/N 5135029-14, also showed signs of weathering. The plywood banded on top was warped and had some delamination of the veneers at the edges. The nails that held the fiberboard shell to the base were loose and the fiberboard had pulled away from the base (see Figures 5-23 and 5-24).

These two packs were opened on 14 Apr 86 and the contents were examined for rust, corrosion, or other damage. No damage or corrosion of either engine was found. Figures 5-25, 5-26 and 5-27 show the commercial engine, S/N 5135029-14, after removal from the pack. (This is the engine that was repacked in 1984.) Figure 5-28 shows the military engine, S/N 5135029-20, after the top half of the foam pack was removed. Figure 5-29 shows a closeup top of the engine, showing no deterioration.

At this time, both of the small packs with the two variations in top frames disappeared. Both packs had been examined the previous month, Mar 86, with nothing to report outside of some bleaching of the fiberboard and very minor nail popping.

5.7. Metal Container Control Evaluation

The metal container was also opened and the engine was removed. No corrosion was visible.

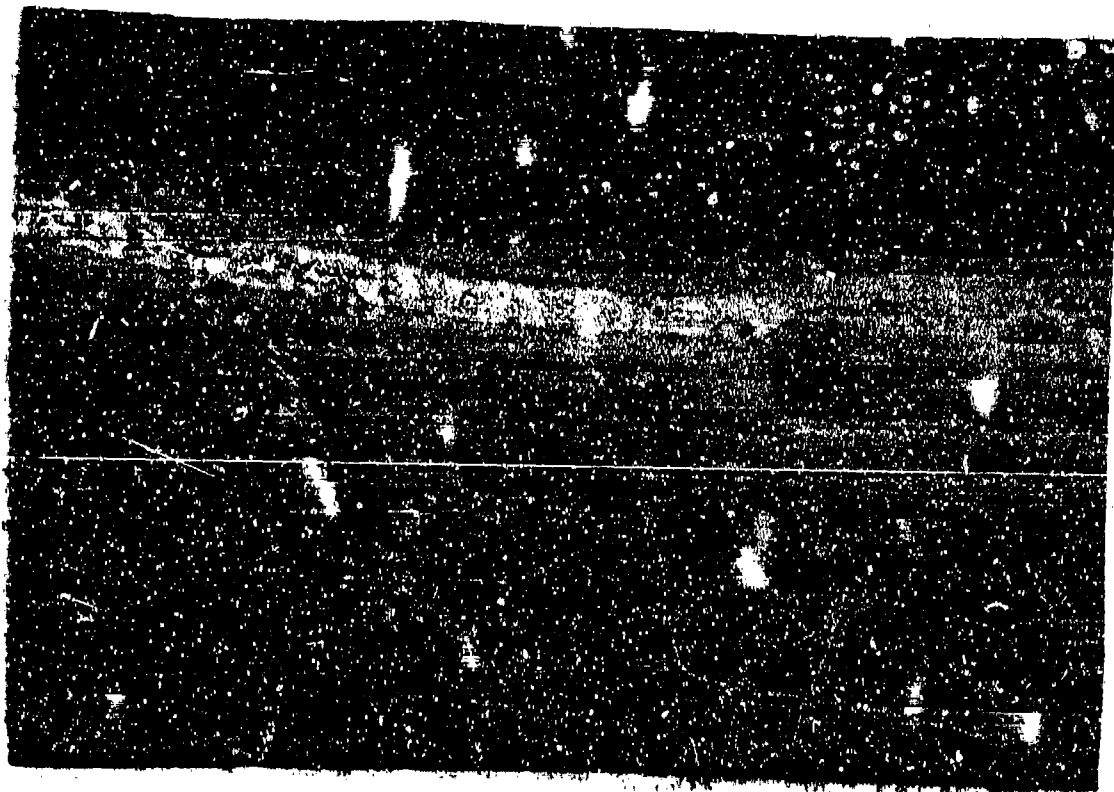


Figure 5-19. Plywood Top Banded to the Pack

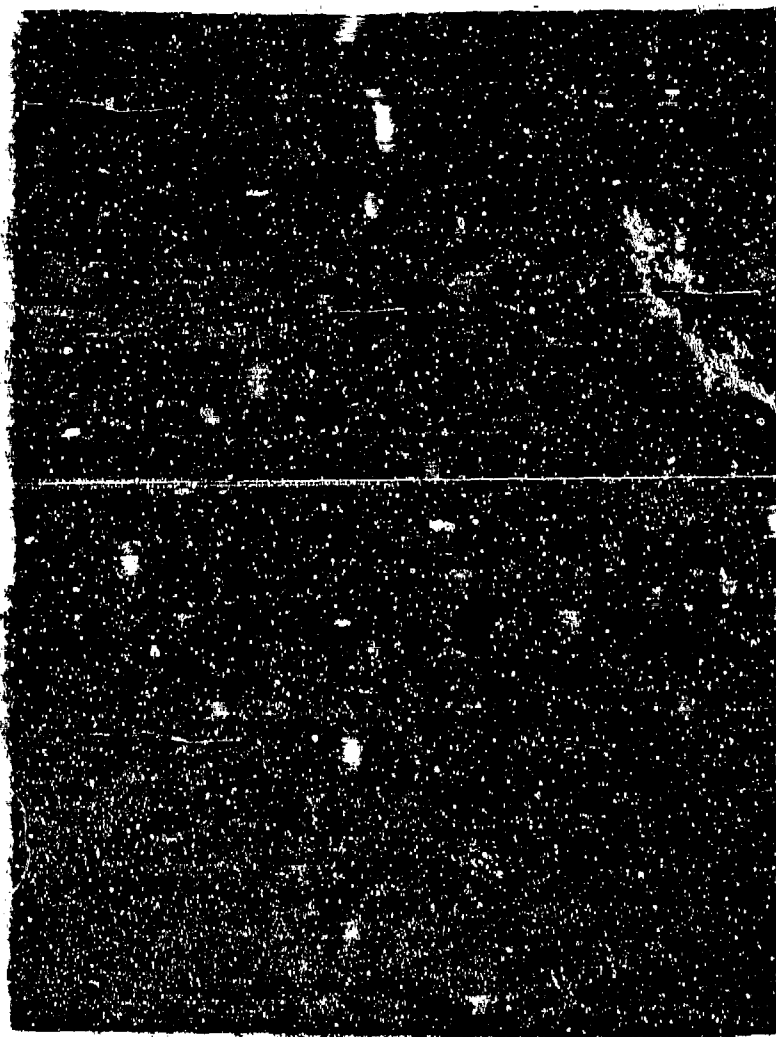


Figure 5-20. Military Engine Pack, Outside 3 Years



(a) Closeup View



(b) Top View

Figure 5-21. Damaged Top of Military Engine Pack

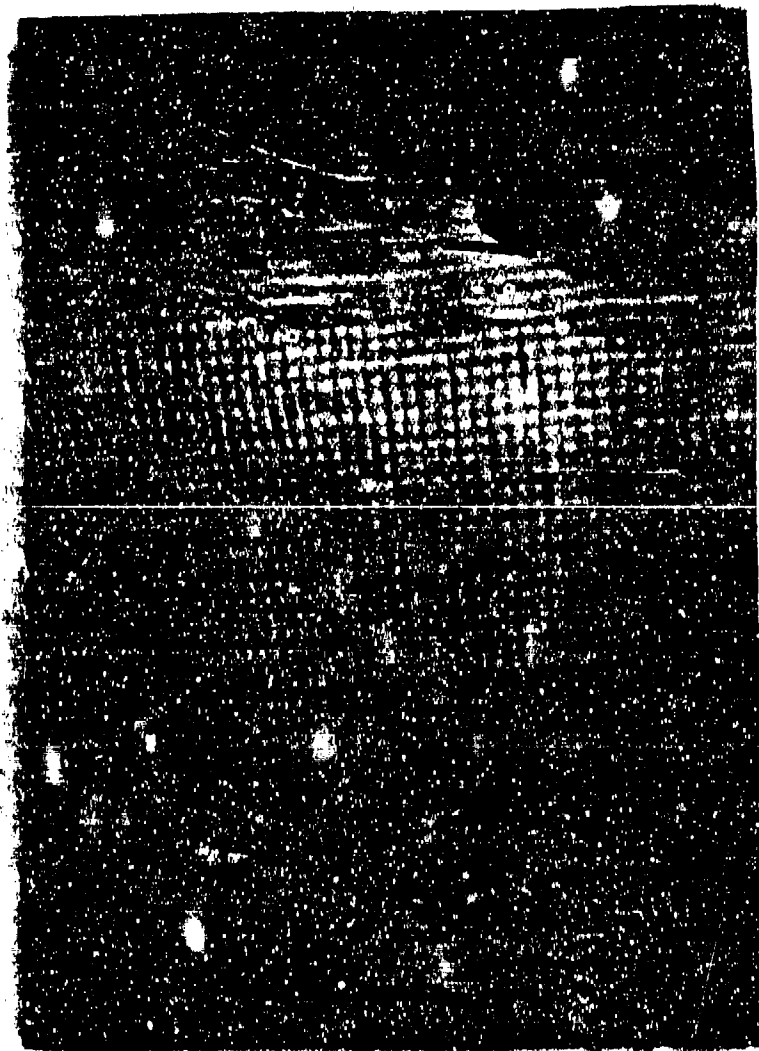


Figure 5-22. Closeup of Damaged Areas.



Figure 5-23. Weathered Commercial Engine Repack



Figure 5-24. Fiberboard Shell on Commercial Engine Repack

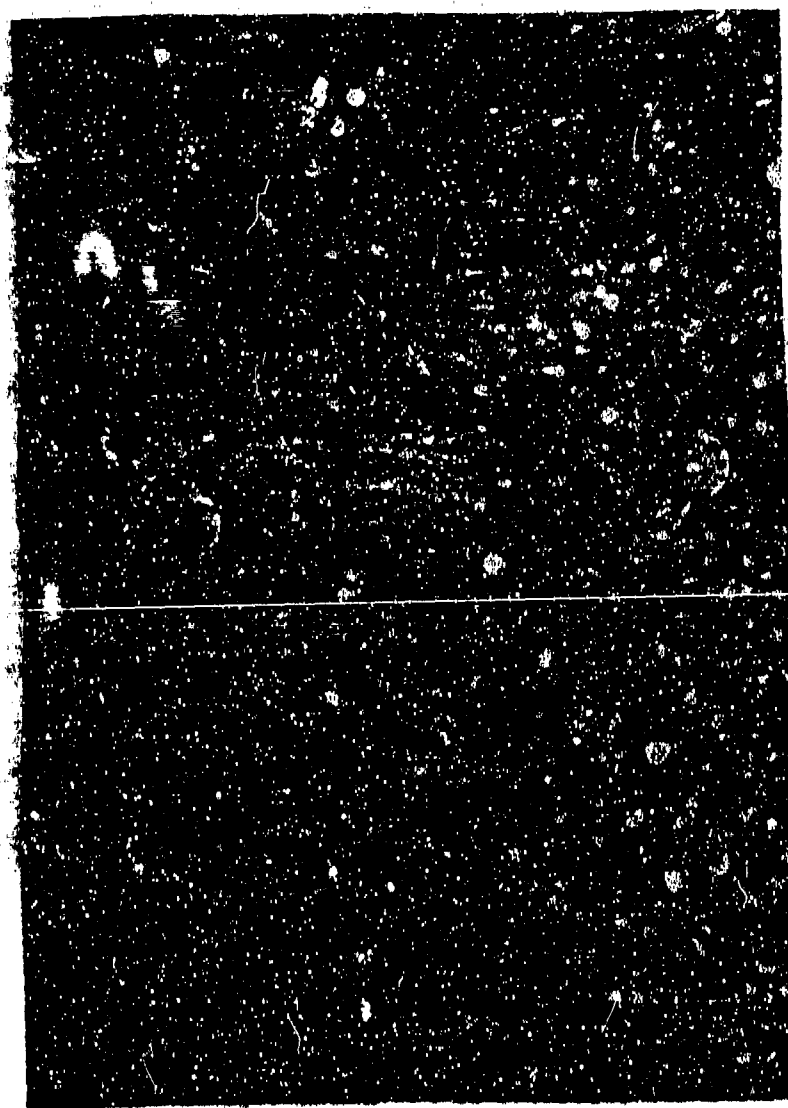
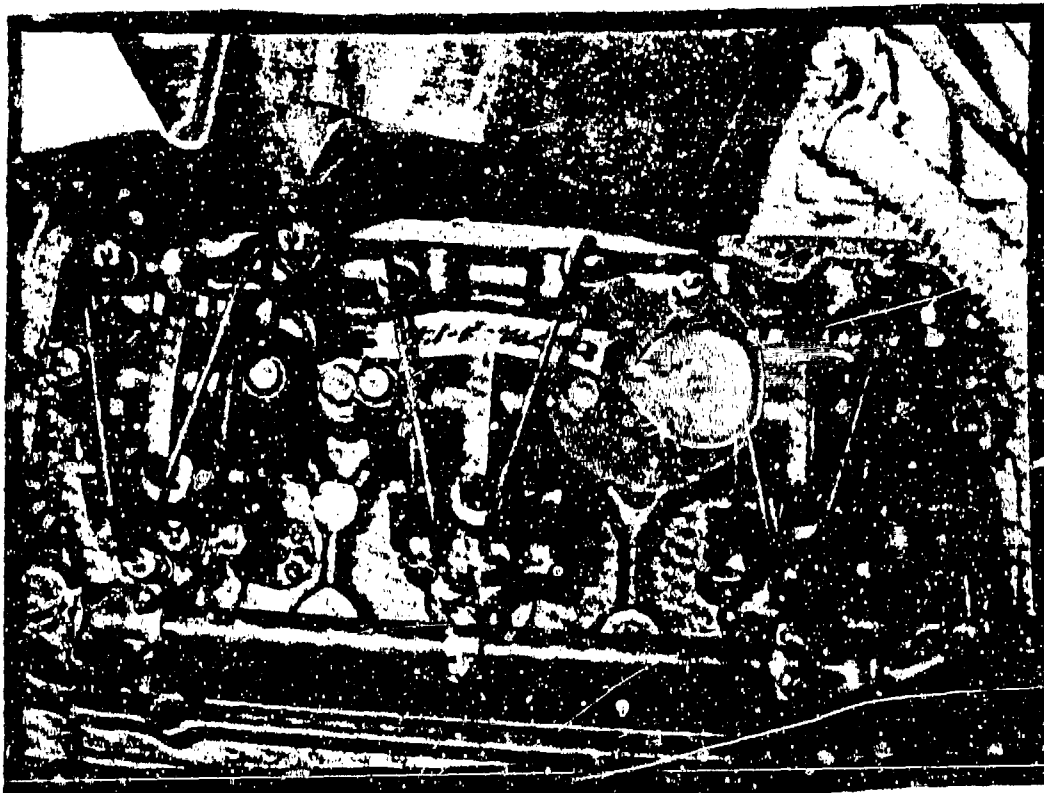
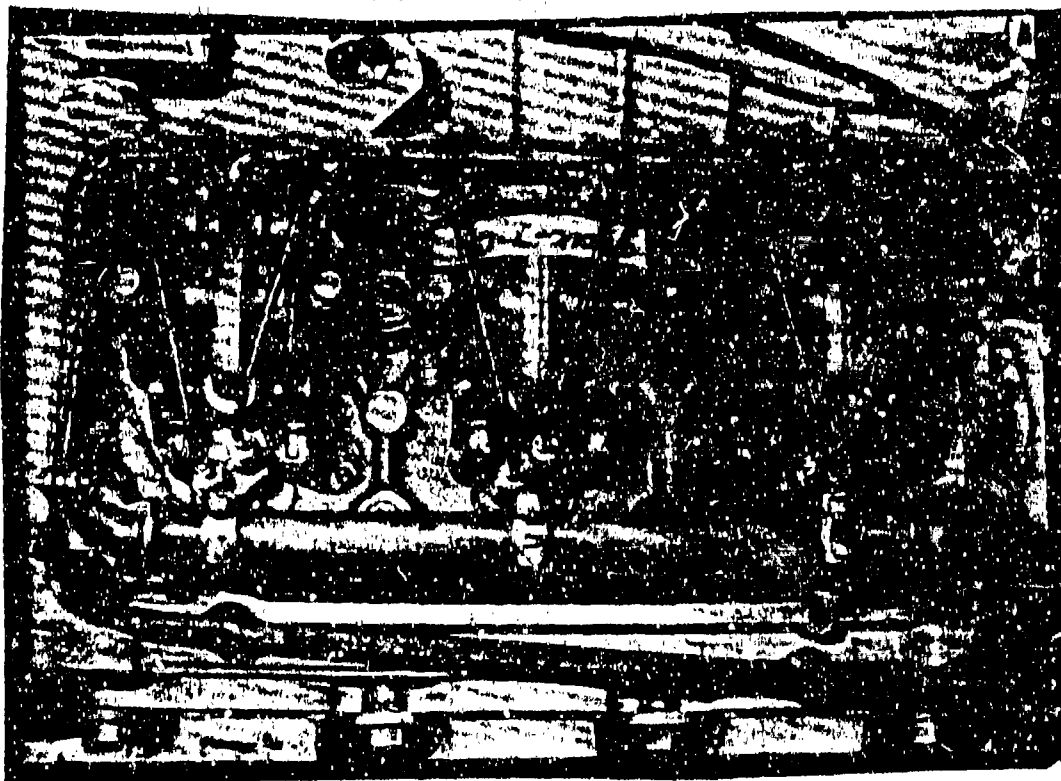


Figure 5-25. Commercial Engine After Test



(a) Left Bank



(b) Right Bank

Figure 5-26. Commercial Engine After Test

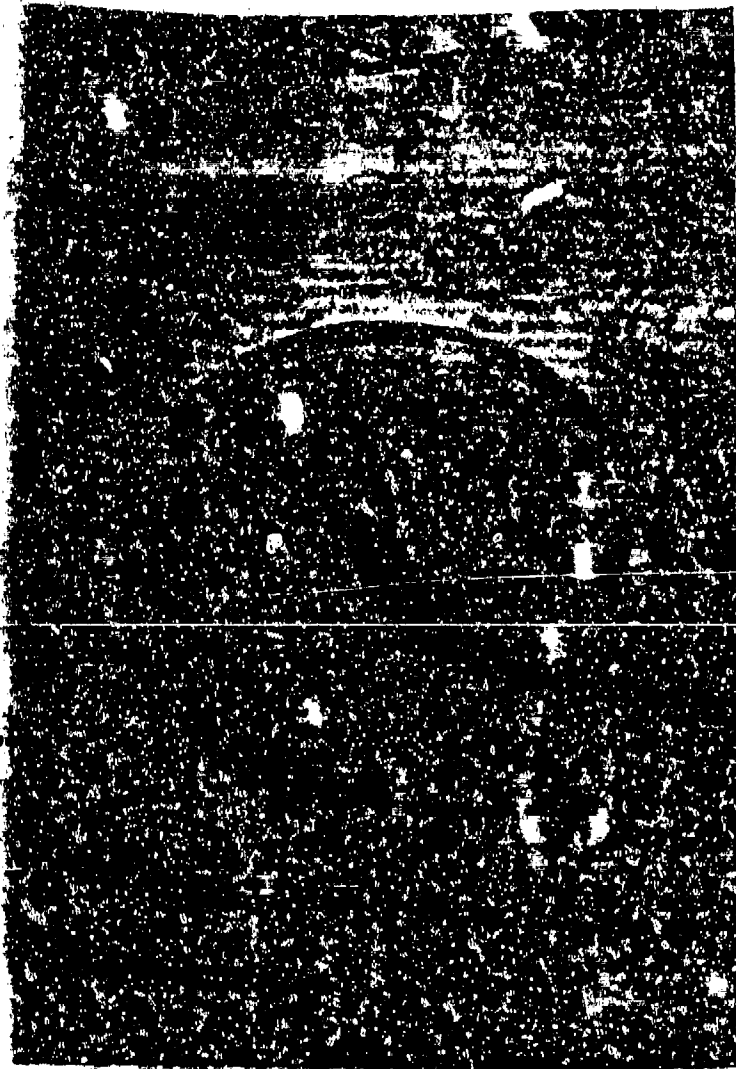


Figure 5-27. Closeup of Commercial Engine After Test

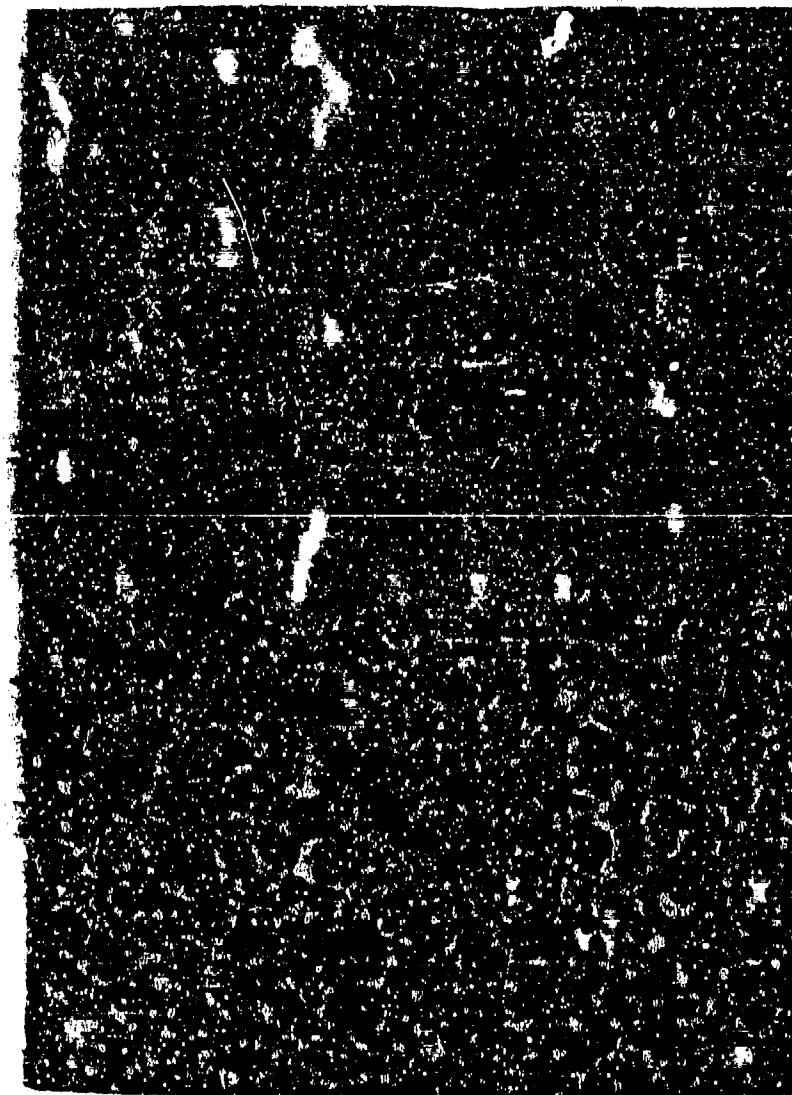


Figure 5-28. Weathered Military Engine With Top Half of Pack Removed

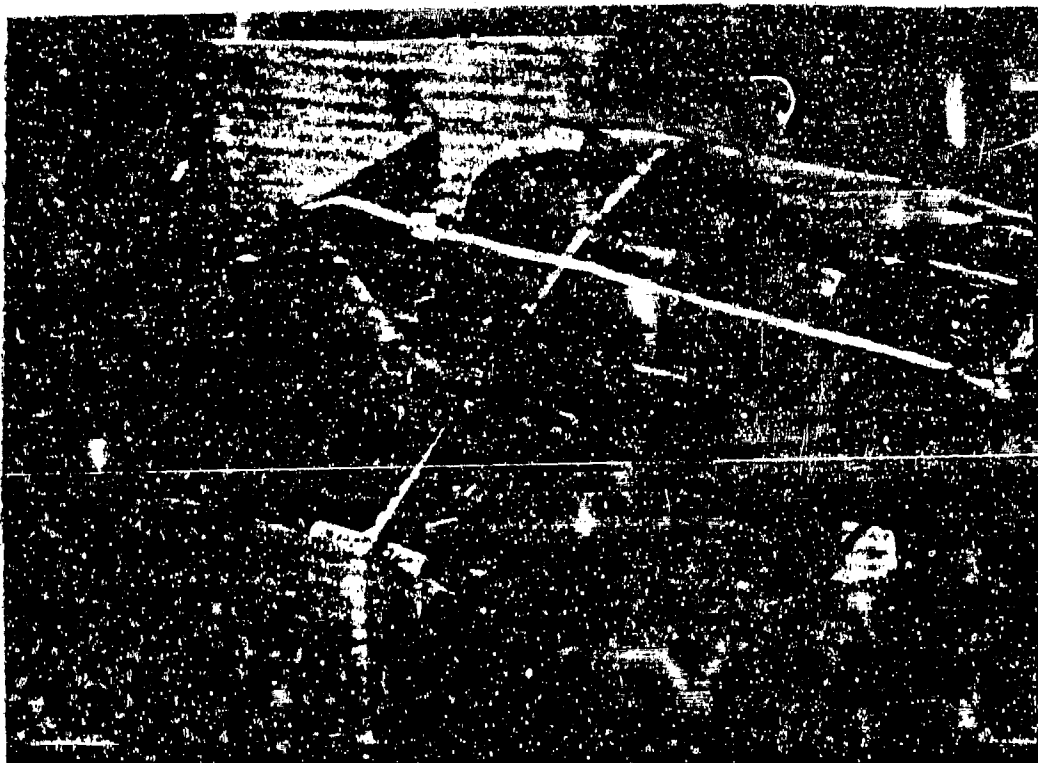


Figure 5-29. Closeup of Military Engine After Test

ADDENDUM

PACKAGING DATA SHEET (Continued) (AMCR 745-2)	SHEET 2 OF 27 SHEETS	PART NO. 8738127	FEDERAL STOCK NO. 2815-054-0244	PACKAGING LEVEL		
				<input type="checkbox"/> A	<input type="checkbox"/> B	<input checked="" type="checkbox"/> C

MORE THAN 100 DEGREES FAHRENHEIT. COOLING SHALL BE ACCOMPLISHED BY INDUCED AIR CURRENTS, CIRCULATION OF COOLANT SYSTEM, OR BY WAITING THE PERIOD OF TIME REQUIRED TO ARRIVE AT THE SPECIFIED TEMPERATURE. SHOULD AMBIENT TEMPERATURE EXCEED 100°F., ENGINE SHALL BE COOLED TO A TEMPERATURE EQUIVALENT TO THE AMBIENT.

(b) AFTER THE ENGINE HAS BEEN COOLED, ENGINE PRESERVATION SHALL BE ACCOMPLISHED AS FOLLOWS IN AN UNINTERRUPTED SEQUENCE.

(c) AN AUXILIARY FUEL CONTAINER EQUIPPED WITH A FUEL LINE, SHUT-OFF VALVE AND FUEL FILTER SHALL BE FILLED WITH LUBRICATING OIL, CONTACT AND VOLATILE CORROSION INHIBITED CONFORMING TO SPECIFICATION MIL-L-46002, GRADE 1. AN OIL SOLUBLE RED DYE CONFORMING TO SPECIFICATION MIL-D-81298 SHALL BE ADDED TO THE OIL IN SUFFICIENT CONCENTRATION TO IMPART A MARKED COLORING TO THE OIL. THE CONTAINER SHALL BE POSITIONED TO PROVIDE GRAVITY FEED OF THE LUBRICATING OIL TO THE ENGINE. THE FUEL LINE FROM THE CONTAINER SHALL BE CONNECTED TO THE INLET SIDE OF THE FUEL PUMP. A LINE SHALL BE CONNECTED FROM THE OUTLET SIDE OF THE FUEL PUMP TO THE FUEL INLET PASSAGE IN THE CYLINDER HEAD. FUEL CROSS OVER LINES, LEFT AND RIGHT BANK, SHALL BE CONNECTED. A TRANSPARENT PLASTIC LINE SHALL BE CONNECTED TO THE ENGINE AT THE FUEL RETURN OUTLET TO DRAIN OFF EXCESS LUBRICATING OIL NOT REQUIRED TO PRESERVE THE FUEL INJECTION SYSTEM AND COMBUSTION CHAMBERS. PLACE OTHER END OF LINE INTO A RECOVERY CONTAINER TO COLLECT RESIDUAL FUEL AND LUBRICATING OIL.

(d) AN AIR RESTRICTOR BOOT SHALL BE FABRICATED AND INSTALLED ON AIR INLET ELBOW AND SECURED TO INSURE THAT AIR TO THE ENGINE IS COMPLETELY CUT OFF. (SHEET NO. 22 ILLUSTRATES AN EXAMPLE OF AN EFFECTIVE AIR RESTRICTOR BOOT).

(e) OPEN SHUT-OFF VALVE FROM AUXILIARY CONTAINER AND CRANK ENGINE WITH STARTING MOTOR FOR A MINIMUM PERIOD OF 30 SECONDS AND NOT EXCEEDING A MAXIMUM PERIOD OF 45 SECONDS. (NOTE: ENGINE MAY FIRE FOR A SHORT DURATION). REPEAT ENGINE CRANKING FOR THE TIME PERIOD SPECIFIED AFTER RESTING STARTING MOTOR FOR 3 MINUTES. THE FUEL SYSTEM AND COMBUSTION CHAMBER, AFTER TWO CRANKING CYCLES, SHOULD BE PRESERVED AS EVIDENCED BY UNDILUTED RED COLORED LUBRICATING OIL BEING EMITTED FROM THE PLASTIC RETURN LINE. THE LUBRICATION SYSTEM SHOULD ALSO BE PRESERVED SIMULTANEOUSLY. IF TWO CRANKING CYCLES DOES NOT PRESERVE INTERNAL COMPONENTS OF ENGINE, REPEAT CRANKING CYCLE AS PRESCRIBED TO ASSURE THOROUGH INTERNAL PRESERVATION.

PACKAGING DATA SHEET (Continued) (AMCA 146-2)	SHEET 2 OF 27 SHEETS	PART NO. 8738127	FEDERAL STOCK NO. 2815-054-0244	PACKAGING LEVEL	
				<input checked="" type="checkbox"/> A	<input checked="" type="checkbox"/> B

CAUTION: CRANKING ENGINE BEYOND TIME PERIOD SPECIFIED MAY DAMAGE STARTING MOTOR OR SOLENOID.

(f) REMOVE AIR RESTRICTOR BOOT. SHUT OFF VALVE FROM AUXILIARY CONTAINER AND DISCONNECT SUPPLEMENTAL FEED AND RETURN LINES.

(g) AFTER PRESERVATION IN ACCORDANCE WITH 2(e) THROUGH (f), ONE OUNCE OF LUBRICATING OIL, GRADE 1, MIL-L-46002 SHALL BE ATOMIZED INTO EACH EXHAUST MANIFOLD AND ONE OUNCE INTO AIR INTAKE OPENING.

(3) PRESERVATION THROUGH OIL LEVEL GAGE ROD OPENING. AFTER PRESERVATION IN ACCORDANCE WITH 2(a) THROUGH (g), DRAIN CRANKCASE OF LUBRICATING OIL, MIL-L-21260 AND REINSTALL DRAIN PLUG. REMOVE OIL LEVEL GAGE ROD AND ATOMIZE SIX OUNCES OF LUBRICATING OIL, GRADE 1, MIL-L-46002 INTO CRANKCASE THROUGH THE OIL LEVEL GAGE ROD OPENING. AN EXTENSION OF SUFFICIENT LENGTH TO PERMIT THE ATOMIZING NOZZLE TO BE WITHIN THE CRANKCASE SHALL BE USED. RE-INSERT OIL LEVEL GAGE ROD.

(4) A PROCESSING RECORD, DD FORM 1397 SHALL BE COMPLETED AND FASTENED TO THE ENGINE. (SEE PAGE 4 FOR ADDITIONAL PRESERVATION REQUIREMENTS).

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PACKAGING DATA SHEET (Continued) (AMCR 76-2)	SHEET 4 OF 27 SHEETS	PART NO. 8738127	FEDERAL STOCK NO. 2815-054-0244	PACKAGING LEVEL A B C
<p>(5) REMOVE AIR CLEANER ADAPTER FROM ENGINE AIR INLET HOUSING. PLACE A PIECE OF BARRIER MATERIAL, TYPE I, GRADE C, CLASS 1, MIL-B-121, ITEM NO. 13, OVER OPENING OF AIR INLET HOUSING WITH WAX-FREE, OR "FACE" SIDE POSITIONED TOWARD HOUSING. RE-INSTALL 4 EACH CAP SCREWS IN HOUSING SECURING BARRIER MATERIAL OVER OPENING.</p> <p>(6) SEAL OPENINGS TO BOTH EXHAUST MANIFOLDS WITH TYPE I, GRADE C, CLASS 1, MIL-B-121 BARRIER MATERIAL, ITEM NO. 14, FACE SIDE TOWARD MANIFOLDS AND SECURE WITH TAPE, PPP-T-97, ITEM NO. 15.</p> <p>(7) POSITION REMOVED AIR CLEANER ADAPTER AGAINST SIDE OF ENGINE BLOCK BETWEEN EXHAUST MANIFOLD AND OIL COOLER ASSEMBLY. SECURE ADAPTER IN POSITION BY APPLYING TAPE, PPP-T-97, ITEM NO. 16, AROUND OIL COOLER WATER OUTLET ELBOW, OVER AIR CLEANER ADAPTER AND AROUND TUBE CONNECTING ENGINE COOLANT PUMP AND THERMOSTAT HOUSING COVER ASSEMBLY.</p> <p>(8) SEAL ALL OPENINGS TO ENGINE ASSEMBLY INCLUDING OIL COOLER ASSEMBLY, FUEL LINES, THERMOSTAT COVER ASSEMBLY, TACHOMETER DRIVE, FUEL PUMP, AND ANY OTHER OPENINGS TO ENGINE INTERIOR WITH TAPE, PPP-T-60, ITEM NO. 17.</p> <p>(9) WRAP FUEL AND OIL FILTER ELEMENTS INDIVIDUALLY WITH BARRIER MATERIAL, MIL-B-121, GRADE A, ITEM NO. 19, AND SECURE WRAPS WITH TAPE. AFTER PROTECTIVE SLEEVE (ITEM NO. 20) IS SECURED IN POSITION, PLACE WRAPPED FILTER ELEMENTS BETWEEN CYLINDER HEAD COVERS AND MANIFOLDS.</p> <p>B. <u>CUSHIONING:</u></p> <p>(1) PLACE FIBERBOARD PAD, ITEM NO. 7, AGAINST FLYWHEEL ASSEMBLY. SECURE WITH TAPE, PPP-T-97, ITEM NO. 18. SEE SHEET 16 FOR ILLUSTRATION.</p> <p>(2) PLACE FIBERBOARD PAD, ITEM NO. 9, OVER COOLANT PUMP PULLEY AND OIL COOLER HOUSING ADJACENT TO ENGINE FRONT SUPPORT TRUNNION. SECURE WITH TAPE, PPP-T-97, ITEM NO. 18. SEE SHEET 16 FOR ILLUSTRATION.</p> <p>NOTE: DOMESTIC GRADE SINGLE WALL MINIMUM 275 psi, PPP-F-320, CUT TO SIZES SPECIFIED IN B(1) AND (2) AND BUILT UP TO THICKNESS EQUAL TO THE SPECIFIED THICKNESS OF 2 EACH TRIPLE WALL PIECES MAY BE USED AS SUBSTITUTES. BUILT UP PIECES TO BE EITHER LAMINATED WITH ADHESIVE OR TAPED TOGETHER TO FORM EACH PAD.</p> <p>(3) PLACE FIBERBOARD PAD, ITEM NO. 8, AGAINST STARTING MOTOR AND OIL PAN. SECURE WITH TAPE, PPP-T-97, ITEM NO. 18. SEE SHEET 16 FOR ILLUSTRATION.</p>				

PACKAGING DATA SHEET (Continued) (AMCR 746-2)	SHEET 5 OF 27 SHEETS	PART NO. 8738127	FEDERAL STOCK NO. 2815-054-0244	PACKAGING LEVEL	
				A	B

(4) PLACE CUSHIONING PADS, ITEM NO'S. 10, 11 AND 12 AS FOLLOWS AND SECURE WITH TAPE, PPP-T-97, ITEM NO. 16;

- ITEM NO. 10 - OVER PIPE PLUG, OIL COOLER HOUSING.
- ITEM NO. 11 - ONE EACH OVER DRAIN COCK, OIL COOLER HOUSING.
- ITEM NO. 12 - ONE EACH OVER PIPE PLUG, UNDERSIDE OF OIL PAN.
- ITEM NO. 7 AND THE OTHER SIDE SECURED TO BACK SIDE OF FLYWHEEL HOUSING. SEE ILLUSTRATION, SHEET NO. 16.
- ONE EACH SECURED TO UNDERSIDE OF OIL PAN SURFACE WHICH RESTS ON POLY-URETHANE BLOCK, ITEM NO. 5 AND PLYWOOD SUPPORT, ITEM NO. 6.

(5) PROTECTIVE SLEEVE:

A PROTECTIVE SLEEVE, ITEM NO. 20, SHALL BE FABRICATED AS ILLUSTRATED ON SHEET 18. IT SHALL BE FORMED TIGHTLY AROUND THE PERIMETER OF THE ENGINE AS ILLUSTRATED ON SHEET 16. THE BOTTOM OF THE SLEEVE TO BE POSITIONED TO BE FLUSH WITH THE BOTTOM OF THE FUEL PUMP HOUSING. THE TOP OF THE SLEEVE TO BE FLUSH WITH THE TOP OF THE AIR HEATER PUMP KNOB AND THERMOSTAT HOUSING COVER ASSEMBLY. THE ENDS WILL BE OVERLAPPED AND SECURELY JOINED WITH TAPE, PPP-T-97, ITEM NO. 21.

NOTE: PRE-SCORING OF SLEEVE WITH SCORING TOOL OR MACHINE MAY BE ACCOMPLISHED PRIOR TO POSITIONING AROUND ENGINE PROVIDED SCORE LINES ARE DIMENSIONED TO ALLOW SLEEVE TO FORM FIT PERIMETER OF ENGINE.

SECURE SLEEVE IN PROPER POSITION USING TAPE, PPP-T-97, ITEM NO. 22 AS FOLLOWS:

ONE PIECE OF TAPE, ITEM NO. 22(A) SHALL BE APPLIED AS ILLUSTRATED ON SHEET 16. ITEM NO. 22(B), 2 PIECES, SHALL BE APPLIED TO THE SLEEVE AND ENGINE AT EACH SIDE. ONE PIECE SHALL BE APPLIED TO SLEEVE AND STARTING MOTOR CONDENSOR; ONE PIECE APPLIED TO OPPOSITE SIDE, SLEEVE TO OIL COOLER WATER OUTLET ELBOW. ADEQUATE TENSION AND POSITIVE SECUREMENT WILL BE MADE IN THE APPLICATION OF THE TAPE TO ASSURE RETENTION OF POSITION OF THE SLEEVE DURING SUBSEQUENT OPERATIONS.

C. INTIMATE WRAP:

THE FIRST WRAP, OR INTIMATE WRAP, ITEM NO. 23, SHALL BE APPLIED WITH THE "FACE" SIDE TOWARD THE ITEM. THE WRAP SHALL BE APPLIED IN SUCH A MANNER TO CONFORM TO THE CONTOUR OF THE ITEM AND SHALL NOT BE LOOSELY APPLIED. THE OVERLAPS (WRAP JOINTS) SHALL BE FIRMLY

PACKAGING DATA SHEET (Continued) (AMCR 746-2)	SHEET 6 OF 27	PAR. NO. 8738127	FEDERAL STOCK NO. 2815-054-0244	PACKAGING LEVEL		
				<input checked="" type="checkbox"/> A	<input type="checkbox"/> B	<input type="checkbox"/> C

STITCHED (ROLLED AND PRESSED) TO ASSURE THAT THE FOAM DOES NOT ENTER THE WRAP AND CONTACT THE ITEM. JOINING OF THE WRAP SHALL BE AS ILLUSTRATED ON SHEET 17.

D. OUTER WRAP:

THE OUTER WRAP, ITEM NO. 24, SHALL BE APPLIED IN THE SAME MANNER AS THE INTIMATE WRAP. TO SECURE THE STITCHED JOINT OF THE KRAFT PAPER, TAPE, ITEM NO. 26, SHALL BE APPLIED ALONG THE SEAM AS ILLUSTRATED ON SHEET 17.

NOTE: TO OBTAIN THE NECESSARY WIDTH OF THE INTIMATE AND OUTER WRAP, SPLICING TWO PIECES MAY BE NECESSARY. SPLICING SHALL BE ACCOMPLISHED AS FOLLOWS:

INTIMATE WRAP: SPLICING WILL BE ACCOMPLISHED USING THE STITCH (ROLLED AND PRESSED) METHOD.

OUTER WRAP: SPLICING WILL BE ACCOMPLISHED USING THE STITCH METHOD. IN ADDITION, TAPE, ITEM NO. 25, WILL BE APPLIED ALONG THE SEAM TO RETAIN POSITION OF SEAM.

E. CONTAINER BASE, SHELL AND TOP FRAME:

THE CONTAINER SHALL HAVE A SKID BASE. SEE SHEETS 10 THRU 15 FOR MATERIALS, CONSTRUCTION AND NAILING REQUIREMENTS. THE CONTAINER SHELL SHALL BE FABRICATED IN A 2 PIECE CONSTRUCTION AS SHOWN ON SHEET 18. THE TWO PIECES WILL BE ASSEMBLED AT THE BODY JOINTS (INSIDE SIDE PANELS) AS ILLUSTRATED ON SHEET 20. METAL STAPLES SHALL BE USED FOR STITCHING WITH SPACING NOT TO EXCEED 1 1/4 INCHES BETWEEN STAPLES. THE SHELL SHALL BE SECURED TO THE PLYWOOD BASE BY STAPLING OR NAILING TO THE EDGE OF THE PLYWOOD. SPACING OF THE FASTENERS WILL NOT EXCEED 4 INCHES. THE TOP FRAME SHALL BE CONSTRUCTED AS SHOWN ON SHEET 19. PRIOR TO ASSEMBLING THE TOP FRAME TO THE CONTAINER SHELL, THE SCORED LIP (1 1/2 INCH DIMENSION) OF THE SHELL SHALL BE FOLDED TO THE INSIDE. THE TOP FRAME SHALL BE THEN PRESSED INTO POSITION AND SECURED TO THE CONTAINER SHELL USING METAL STAPLES OR NAILS IN THE SAME MANNER AS THE SHELL IS SECURED TO THE BASE. THIS SHALL BE ACCOMPLISHED EITHER PRIOR TO THE INITIAL POUR OF POLYURETHANE FOAM OR PRIOR TO THE FINAL POURS. BASE SUPPORTS, ITEM NO. 3, SHALL BE NAILED TO THE PLYWOOD DECKBOARD AS SHOWN ON SHEET 15 USING 12-d, CEMENT COATED NAILS (FF-N-105), ITEM NO. 34.

PACKAGING DATA SHEET (Continued)
(AMCR 746-2)

SHEET 7 OF 27 SHEETS

PART NO.
8738127

FEDERAL STOCK NO.

2815-054-0244

PACKAGING LEVEL

A B C

F. BARRIER/CUSHIONING:

1. POLYURETHANE FOAM SHALL BE FIRE RESISTANT (NON-BURNING). EXCEPTIONS TO, AND ADDITIONAL REQUIREMENTS TO THE SPECIFICATION ARE AS FOLLOWS:

(a). PHYSICAL PROPERTIES:

- (1). COMPRESSIVE STRENGTH -- PARALLEL TO DIRECTION OF RISE, 30 PSI, MINIMUM.
- (2). PERPENDICULAR TO DIRECTION OF RISE, 15 PSI, MINIMUM.
- (3). UNICELLULARITY -- PER CENT OPEN CELLS MAXIMUM, 10%.
- (3). DENSITY -- POUNDS PER CUBIC FOOT, 2.0 +0.2, -0.1.

(b). CHEMICAL PROPERTIES:

- (1). TOXICITY -- FOAMS SHALL BE FORMULATED TO PRODUCE MINIMUM TOXIC EFFECTS CONSISTENT WITH PERFORMANCE. TOLUENE DIISOCYANATE (TDI) TYPE FOAMS AND FOAMS WITH SIMILAR TOXIC SIDE EFFECTS SHALL NOT BE USED.
- (2). FOAM SYSTEMS -- FOAM FORMULATION SHALL BE OF THE TWO COMPONENT SYSTEM WITH A MIX RATIO BY WEIGHT OR VOLUME, AS APPLICABLE, OF 1:1 EQUAL PARTS ACCORDING TO MANUFACTURER'S RECOMMENDATIONS. THE FOAM SHALL BE CAPABLE OF BEING HAND OR MACHINE MIXED AND POURED IN ACCORDANCE WITH THE MANUFACTURER'S INSTRUCTIONS.

2. THE ENGINE SHALL BE POSITIONED ON TWO PREFABRICATED POLYURETHANE FOAM BLOCKS WITH PLYWOOD SUPPORTS, ITEM NO'S. 4, 5 AND 6 AS ILLUSTRATED ON SHEET 15.

NOTE 1: IT MAY BE NECESSARY TO POSITION AN ADDITIONAL POLYURETHANE/PLYWOOD SUPPORT BLOCK UNDER THE OIL COOLER TO STABILIZE AND LEVEL THE LOAD AND PREVENT COMPRESSION AND POTENTIAL CELL COLLAPSE ON OIL COOLER SIDE OF BLOCKS 4 AND 5.

NOTE 2: RECOMMEND THE SUPPORT BLOCKS (ITEMS 4 AND 5) BE LAMINATED TO THE BOTTOM OF THE CONTAINER WITH A COMMERCIAL GRADE OF ADHESIVE, FAST BOND IN ORDER TO FACILITATE POSITIONING THE ITEM ON THE BLOCKS AND RETAIN PROPER SETTING. THE PLYWOOD LOAD BEARING SUPPORTS, ITEM NO. 6, SHOULD BE LAMINATED TO THE POLYURETHANE BLOCKS USING THE SAME ADHESIVE. ADHESIVE CONFORMING TO SPECIFICATION MMM-A-001058, ADHESIVE, RUBBER BASE, (IN PRESSURIZED DISPENSERS) HAS BEEN USED SUCCESSFULLY FOR THIS APPLICATION.

PACKAGING DATA SHEET (Continued)
(AMCR 746-2)

SHEET 8 OF 27 SHEETS

PART NO.

8738127

FEDERAL STOCK NO.

2815-054-0244

PACKAGING LEVEL

[A] [B] [C]

3. THE WRAPPED ITEM, WHEN POSITIONED ON THE SUPPORT BLOCKS WITHIN THE CONTAINER SHALL HAVE MINIMUM CLEARANCES BETWEEN THE CONTAINER WALLS AND THE OUTERMOST PROJECTIONS OF THE WRAPPED ITEM AS SHOWN ON SHEET 20.

4. THE TWO CHEMICAL COMPONENTS SHALL BE MIXED AS PRESCRIBED BY THE SUPPLIER OF THE CHEMICALS IN WEIGHT OR VOLUME REQUIRED THAT WILL PRODUCE THE APPROPRIATE AMOUNT OF POLYURETHANE FOAM TO COMPLETELY ENCAPSULATE THE ITEM AND FILL ALL VOID AREAS AS SHOWN ON SHEET 20.

CAUTION: POLYURETHANE FOAM CHEMICALS MUST BE COMPATIBLE WITH THE DISPENSING EQUIPMENT BEING USED IN ORDER TO PRODUCE A QUALITY POLYURETHANE CURED FOAM.

5. THE PACKAGE SHALL POSSESS THE FOLLOWING PHYSICAL AND DIMENSIONAL CHARACTERISTICS SUBSEQUENT TO THE CURING OF THE FOAM:

(a) DIMENSIONAL STABILITY. FINAL PACKAGE SHALL BE FLAT ON ALL SIDES, TOP, BOTTOM AND ENDS. MAXIMUM PERMISSIBLE VARIANCE FROM THE PLANE OF EACH EXTERIOR PANEL IS:

CONCAVE - $\frac{1}{8}$ INCH MAXIMUM
CONVEX - $\frac{5}{8}$ INCH MAXIMUM

A CONFORMING (RESTRAINING) DEVICE SHALL BE USED DURING THE POURING, RISE AND INITIAL CURING CYCLE OF THE FOAM TO ASSURE THAT THIS REQUIREMENT IS MET.

NOTE: CONCAVE (OR DEPRESSED) AREAS ARE NORMALLY CREATED FROM SHRINKAGE, I.E. WHEN THE FOAM RISES TO THE MAXIMUM HEIGHT AND UPON STANDING, CONTRACTS AND FORMS WRINKLES OR IDENTATIONS. CONVEX (OR BULGED) AREAS ARE NORMALLY CAUSED FROM INADEQUATELY RESTRAINING THE FOAM DURING THE RISE, GEL AND INITIAL CURE CYCLE, OR REMOVING THE FOAMED PACKAGE FROM THE RESTRAINING DEVICE PRIOR TO COMPLETION OF CELL EXPANSION.

(b) PHYSICAL STABILITY. PACKAGE MUST BE CAPABLE OF WITHSTANDING, AND BE SUBJECTED TO THE TESTS AND VISUAL INSPECTIONS PRESCRIBED ON SHEETS 25 THRU 27.

PACKAGING DATA SHEET (Continued) (AMCR 745-2)	SHEET 9 OF 27	PART NO. 8738127	FEDERAL STOCK NO. 2815-054-0244	PACKAGING LEVEL		
				<input checked="" type="checkbox"/> A	<input type="checkbox"/> B	<input type="checkbox"/> C

G. IN ADDITION TO THE NORMAL MARKING REQUIREMENTS OF MIL-STD-129, ALL CONTAINERS SHALL HAVE THE MARKINGS IDENTIFIED ON SHEETS 21, 23 AND 24. ALSO, EACH CONTAINER SHALL HAVE INCLUDED IN THE IDENTIFICATION MARKING (MIL-STD-129), THE SERIAL NUMBER OF THE ENGINE CONTAINED IN THE PACKAGE.

H. THE POLYURETHANE FOAM PACKAGE WILL SERVE AS THE SHIPPING CONTAINER.

PATENT NOTE: FOAM-IN-PLACE POLYURETHANE PATENT NO'S. 2,897,641; 2,895,603; 2,985,287; 24,767 (REISSUE).

PACKAGING DATA SHEET (Continued) (AMCR 746-2)			PART NO.		FEDERAL STOCK NO.		PACKAGING LEVEL	
SHEETS 10 OF 27			8738127		2815-054-0244		A B C	
BILL OF MATERIALS:								
ITEM NO.	DESCRIPTION	SIZE	SPECIFICATION DATA			QTY REQ'D.		
(*) 1.	SKIDS, WOOD	3 X 4 X 42	MIL-STD-731, GROUP II OR III, CLASS 2			3 EA.		
(*) 2.	DECKBOARD, PLYWOOD	45 X 42 X 3/4	NN-P-530, GROUP B, 5 PLY (PS-1), STD. INT. WITH EXT. GLUE, GROUPS 1, 2 OR 3 SPECIES ONLY. QUALITY CONFORM TO PS-1.			1 EA.		
3.	SUPPORT, BASE	2 X 6 X 45	MIL-STD-731, GROUP II OR III, CLASS 2			2 EA.		
4.	BLOCK, POLYURETHANE	12 X 5 1/2 X 7 1/2	MIL-P-21929, CLASS 1, DENSITY-2.0 LBS/CU.FT.			1 EA.		
5.	BLOCK, POLYURETHANE	12 X 5 1/2 X 5 1/2	MIL-P-21929, CLASS 1, DENSITY-2.0 LBS/CU.FT.			1 EA.		
6.	SUPPORT, LOAD BEARING, PLYWOOD	12 X 5 1/2 X 1/2	NN-P-530, GROUP B, 3 PLY (PS-1), STD. INT., GROUPS 1, 2 OR 3 SPECIES ONLY. QUALITY CONFORM TO PS-1.			2 EA.		
7.	PAD, FIBERBOARD	11 1/2 X 11 1/2	PPP-F-320, TYPE CF, GRADE 1100, CLASS DOM.			2 EA.		
8.	PAD, FIBERBOARD	12 X 12	PPP-F-320, TYPE CF, GRADE 275 MINIMUM CLASS DOM.			1 EA.		
9.	PAD, FIBERBOARD	12 X 8	PPP-F-320, TYPE CF, GRADE 1100, CLASS DOM.			2 EA.		
10.	PAD, CUSHIONING (NOT ILLUSTRATED)	4 X 2, 1/4 IN. THK.	PPP-G-843 OR PPP-G-1797			1 EA		

PACKAGING DATA SHEET (Continued) (AMCR 746-2)		SHEET 11 OF 27	PART NO. 8738127	FEDERAL STOCK NO. 2815-054-0244	PACKAGING LEVEL [A] [B] [E]	
ITEM NO.	DESCRIPTION	SIZE	SPECIFICATION	QTY REQ'D		
11.	PAD, CUSHIONING (NOT ILLUSTRATED)	4 X 4, 1/4 IN. THK.	PPP-C-843 OR PPP-C-1797	2 EA.		
12.	PAD, CUSHIONING	12 X 6, 1/4 IN. THK.	PPP-C-843 OR PPP-C-1797	2 EA.		
13.	WRAP, AIR INLET HOUSING (NOT ILLUSTRATED)	12 X 12	MIL-B-121, TYPE I, GRADE C, CLASS 1	1 EA.		
14.	WRAP, MANIFOLD OPENING (NOT ILLUSTRATED)	6 X 6	MIL-B-121, TYPE I, GRADE C, CLASS 1	2 EA.		
15.	TAPE (FOR SECURING ITEM NO. 14) (NOT ILLUSTRATED)	1 X 12	PPP-T-97, TYPE II	2 EA.		
16.	TAPE (FOR SECURING AIR CLEANER ADAPTER TO ENGINE BLOCK)	1 X (24 APPROX.) (NOT ILLUSTRATED)	PPP-T-97, TYPE II	1 EA.		
17.	TAPE (FOR SEALING OPENINGS TO ENGINE) (NOT ILLUSTRATED)	2 IN. WIDE LGTH'S AS REQ'D.	PPP-T-60, TYPE III, CLASS 1	AS REQ'D.		
18.	TAPE (FOR SECURING CUSHIONING AND FIBERBOARD PADS)	1 IN. WIDE LGTH'S AS REQ'D.	PPP-T-97, TYPE II	AS REQ'D.		
19.	WRAP, FILTER ELEMENTS (NOT ILLUSTRATED)	AS REQ'D.	MIL-B-121, TYPE II GRADE A, CLASS 1	3 EA.		

PACKAGING DATA SHEET (Continued) (AMCR 746-2)		SHEET OF SHEETS 12 27	PART NO. 8738127	FEDERAL STOCK NO. 2815-054-0244	PACKAGING LEVEL A B C	
BILL OF MATERIALS (CONT'D)						
ITEM NO.	DESCRIPTION	SIZE	SPECIFICATION	QTY REQ'D		
20.	SLEEVE, PROTECTIVE	120 X 14	PPP-F-320, TYPE CF, GRADE V3C, CLASS WR	1 EA.		
21.	TAPE (FOR SECURING SLEEVE JOINT) (NOT ILLUSTRATED)	1 X (24 APPROX)	PPP-T-97, TYPE II	1 EA.		
22.	TAPE (FOR SECURING SLEEVE TO ENGINE)		PPP-T-97, TYPE II			
	(A)	1 X 60		1 EA.		
	(B)	1 X 18		2 EA.		
23.	WRAP, INTIMATE	132 X 72	MIL-B-121, TYPE I, GRADE C, CLASS 1	1 EA.		
24.	WRAP, OUTER	132 X 72	UU-P-269, GRADE B, BASIS WT, 40 MIN.	1 EA.		
25.	TAPE (FOR JOINING 2 PG. OUTER WRAP)	2 X 132	UU-T-106	1 EA.		
26.	TAPE (FOR SECURING OUTER WRAP)	2 X 72	UU-T-106	1 EA.		
27.	SHELL, CONTAINER, FIBERBOARD (2 PG. CONSTRUCTION)	SEE SHEET 18	PPP-F-320, TYPE CF, GRADE V3C, CLASS WR	2 EA.		
28.	NAILS, STANDARD BOX OR COMMON ALTERNATE: STAPLES, WIRE	2-d $\frac{1}{8}$ IN. CROWN $\frac{1}{8}$ IN. LEG.	FF-N-105	44 EA. (MIN.) 44 EA. (MIN.)		

PACKAGING DATA SHEET (Continued) (AMCR 746-2)	SHEET 13 OF 27	PART NO. 8738127	FEDERAL STOCK NO. 2815-054-0244	PACKAGING LEVEL A B E
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BILL OF MATERIALS (CONT'D)

ITEM NO.	DESCRIPTION	SIZE	SPECIFICATION	QTY REQ'D
(**)	TOP FRAME			
(A)	LONGITUDINAL MEMBER	1 X 4 X 44-3/4	MIL-STD-731, GROUP II OR III, CLASS 2	3 EA.
(B)	CROSS MEMBER	1 X 4 X 41-3/4		3 EA.
(C)	NAILS, STD BOX OR COMMON	5-d (1-5/8 IN. LG)	FF-N-105	27 EA.
30.	NAILS, STD BOX OR COMMON ALTERNATE: STAPLE, WIRE	2-d 1/4 IN. CROWN 1/2 IN. LEG.	FF-N-105	44 EA. (MIN.)
31.	LABEL, OPENING INSTRUCTION	AS REQ'D (SEE SHEET 23)	MIL-STD-129	1 EA.
32.	LABEL, REUSABILITY	AS REQ'D (SEE SHEET 24)	MIL-STD-129	1 EA.
33.	FOAM, POLYURETHANE		MIL-P-21929, CLASS 1, DENSITY 2.0 LBS/CU.FT.	*** 74 LBS.
34.	NAILS, STD BOX OR COMMON	12-d	FF-N-105	12 EA.

(*) SKIDS SHALL BE SECURED TO THE DECKBOARD BY METHOD (A) OR (B) BELOW:

(A) NAILS, PALLET, 10 GA., 2-1/2 IN. LG., STYLE 18, TYPE II, SPECIFICATION FF-N-105, SHALL BE DRIVEN THROUGH DECKBOARD AND INTO SKIDS. NAILS TO BE ARRANGED IN TWO ROWS, STAGGERED PATTERN WITH SPACING BETWEEN NAILS IN EACH ROW NOT TO EXCEED 6 INCHES.

PACKAGING DATA SHEET (Continued)
(AMCR 745-2)

SHEET OF SHEETS
14 27

PART NO.

8738127

FEDERAL STOCK NO.

2815-054-0244

PACKAGING LEVEL

☒ A ☐ B ☐ C

BILL IF MATERIALS (CONT'D)

(B) NAILS, STANDARD BOX OR COMMON, SPECIFICATION FF-N-105, SHALL BE DRIVEN THROUGH DECKBOARD INTO AND THROUGH SKIDS AND BE GLINCHED NOT LESS THAN 1/8 INCH. ARRANGEMENT AND SPACING SHALL BE AS DEFINED IN A, ABOVE.

(**) TOP FRAME SHALL BE ASSEMBLED BY DRIVING 3 EACH NAILS THROUGH LONGITUDINAL MEMBERS, INTO AND THROUGH CROSS MEMBERS AT EACH POINT OF INTERSECTION AND GLINCHED 1/8 INCH MINIMUM.

(***) AMOUNT OF FOAM SHOWN SHOULD ONLY BE USED FOR ESTIMATING. FIGURE OF 74 LBS. REPRESENTS APPROXIMATE WEIGHT OF CURED FOAM. EXACT AMOUNT OF FOAM REQUIRED SHOULD BE DETERMINED DURING PRE-PRODUCTION PHASE.

PACKAGING DATA SHEET (Continued)
(AMCR 746-2)

SHEET 15 OF 27

PART NO.

8738127

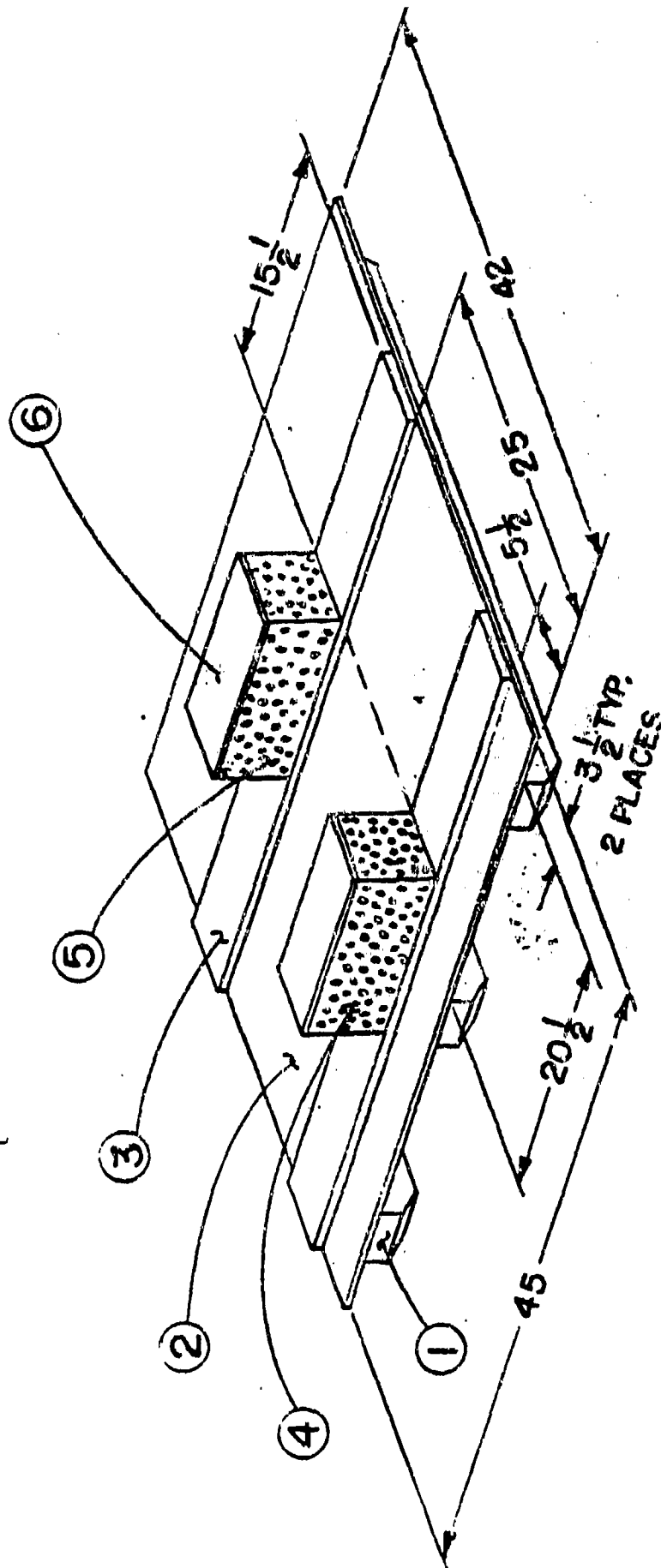
FEDERAL STOCK NO.

2815-054-0244

PACKAGING LEVEL



255



PACKAGING LEVEL
☒ A ☐ B ☐ C

FEDERAL STOCK NO.

2815-054-0244

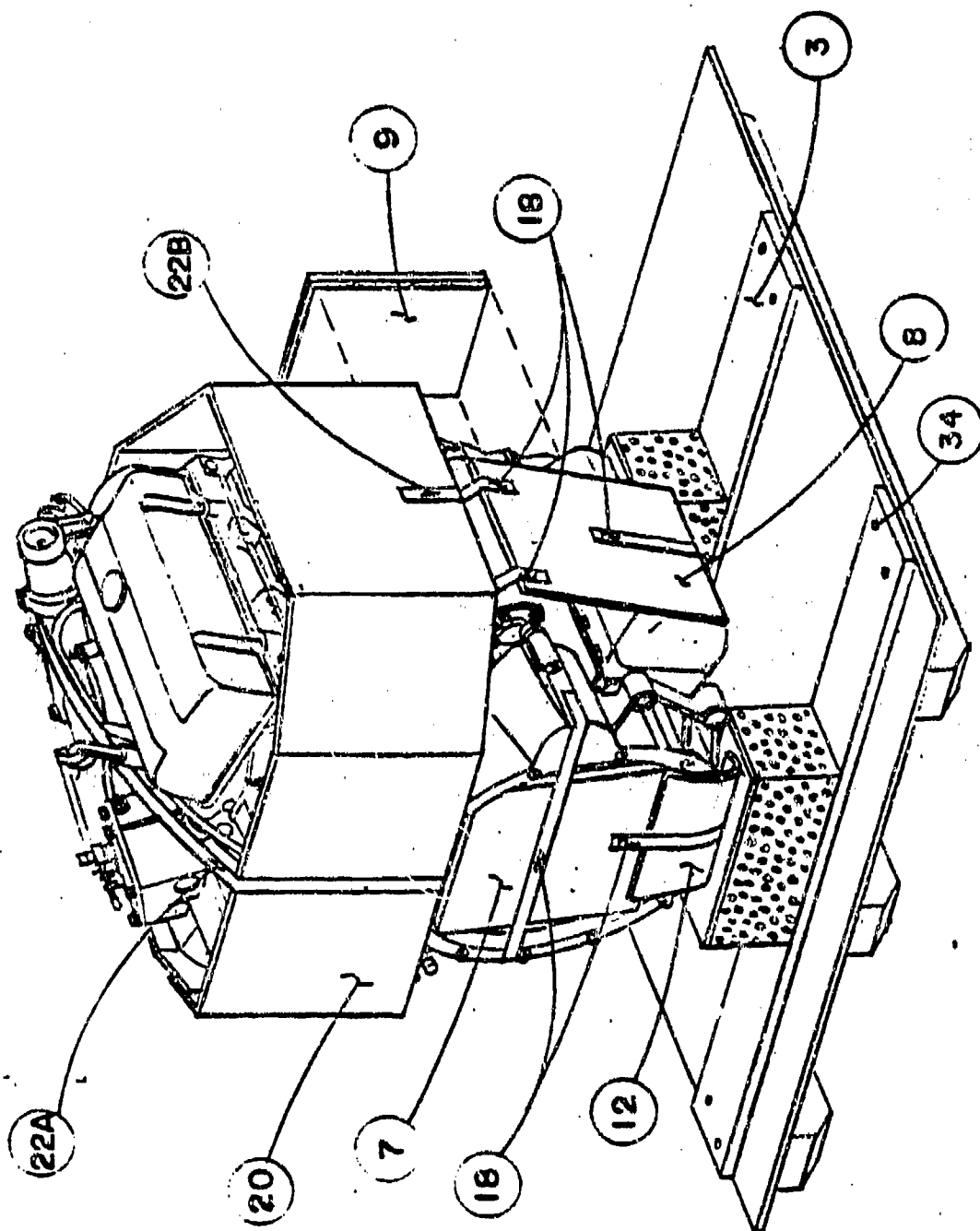
PART NO.

8738127

SHEET 16 OF 27 SHEETS

PACKAGING DAY SHEET (Continued)
 (A1, 746-2)

1735



PACKAGING DATA SHEET (Continued)
(AMCR 746-2)

SHEET 17 OF 27 SHEETS

PART NO.

8738127

FEDERAL STOCK NO.

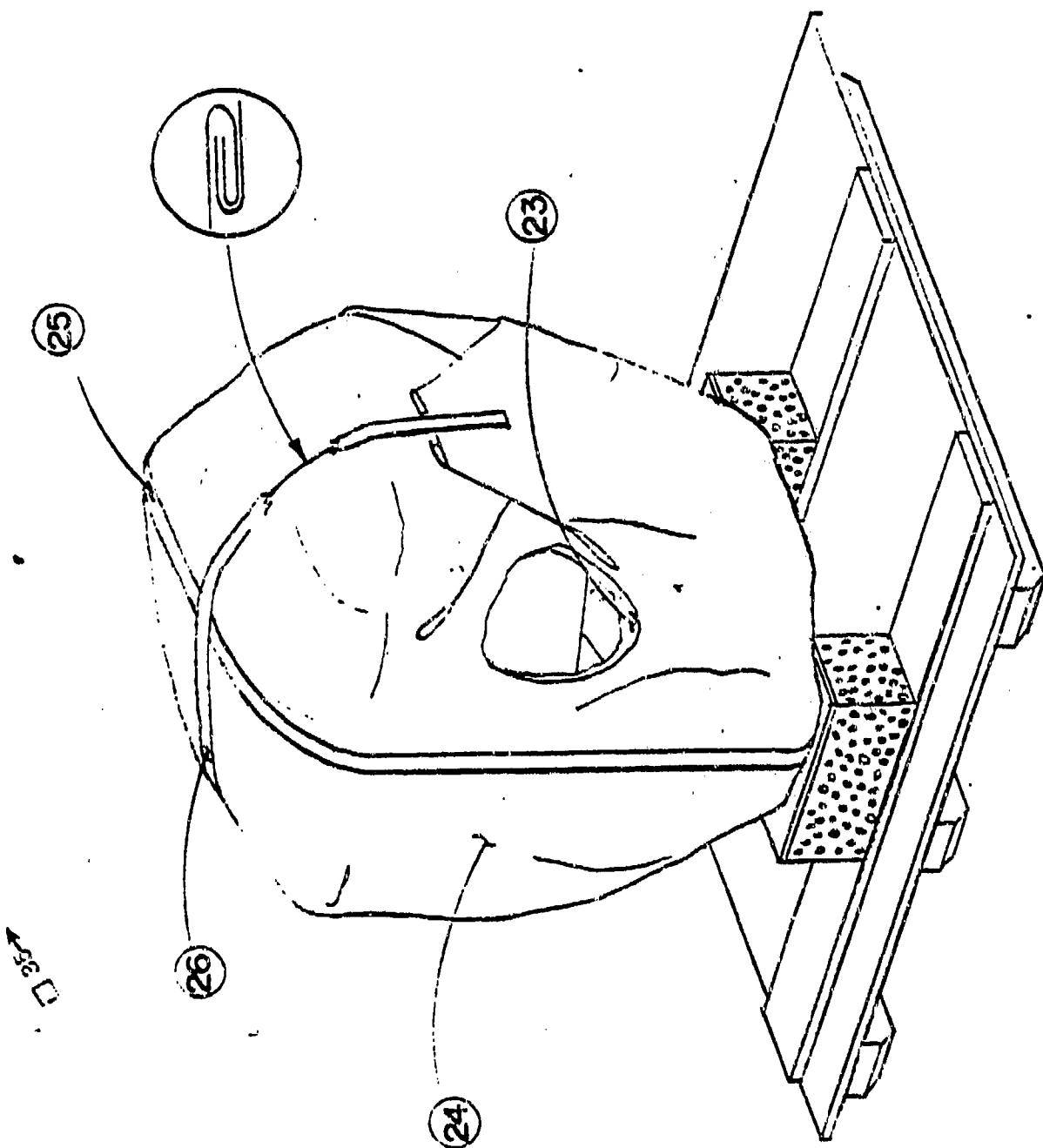
2815-054-0244

PACKAGING LEVEL

A

B

C



PACKAGING DATA SHEET (Continued) (AMCR 746-2)	SHEET 18 OF 27 SHEETS	PART NO. 8738127	FEDERAL STOCK NO. 2815-054-0244	PACKAGING LEVEL		
				<input checked="" type="checkbox"/> A	<input type="checkbox"/> B	<input type="checkbox"/> C

1 1/2" 48" 49 1/2" 2" 1/4 SLOT 1/4 MAX.

(27)

DIRECTION OF FLUTES

(20)

14" 120"

DIRECTION OF FLUTES

7ms

PACKAGING DATA SHEET (Continued)
(AMCR 746-2)

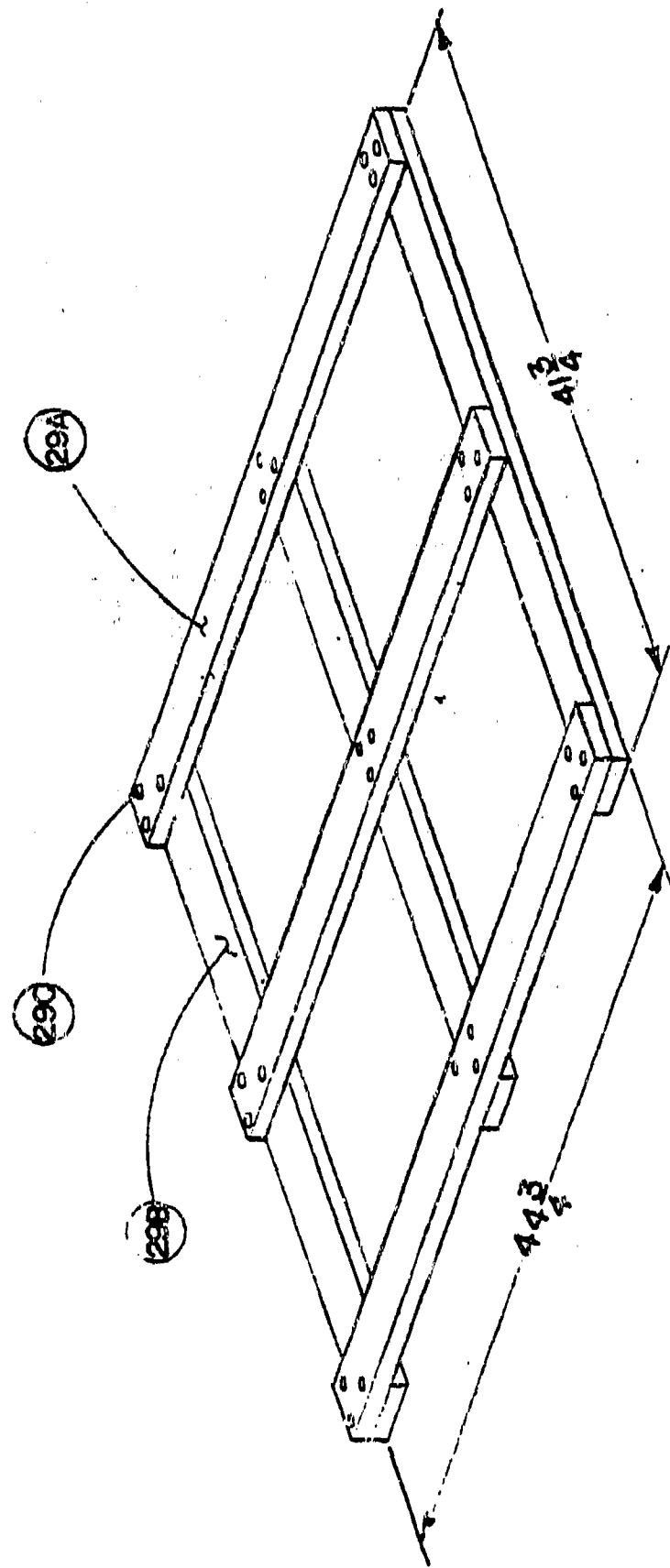
SHEET 19 OF 27 SHEETS

PART NO.
8738127

FEDERAL STOCK NO.
2815-054-0244

PACKAGING LEVEL
A B C

35



PACKAGING DATA SHEET (Continued)
(AMCR 746-2)

SHEET OF SHEETS
20 27

PART NO.

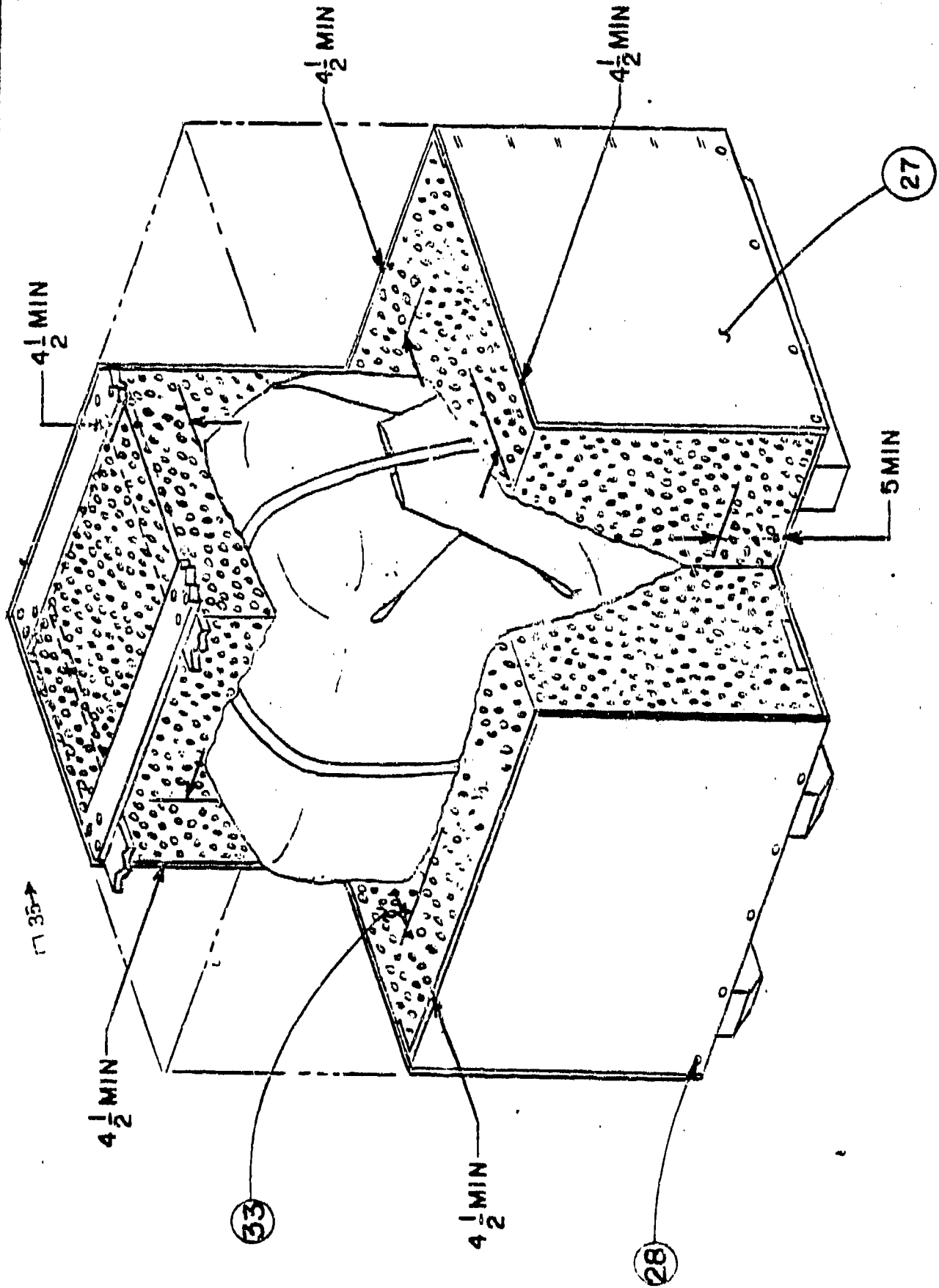
8738127

FEDERAL STOCK NO.

2815-054-0244

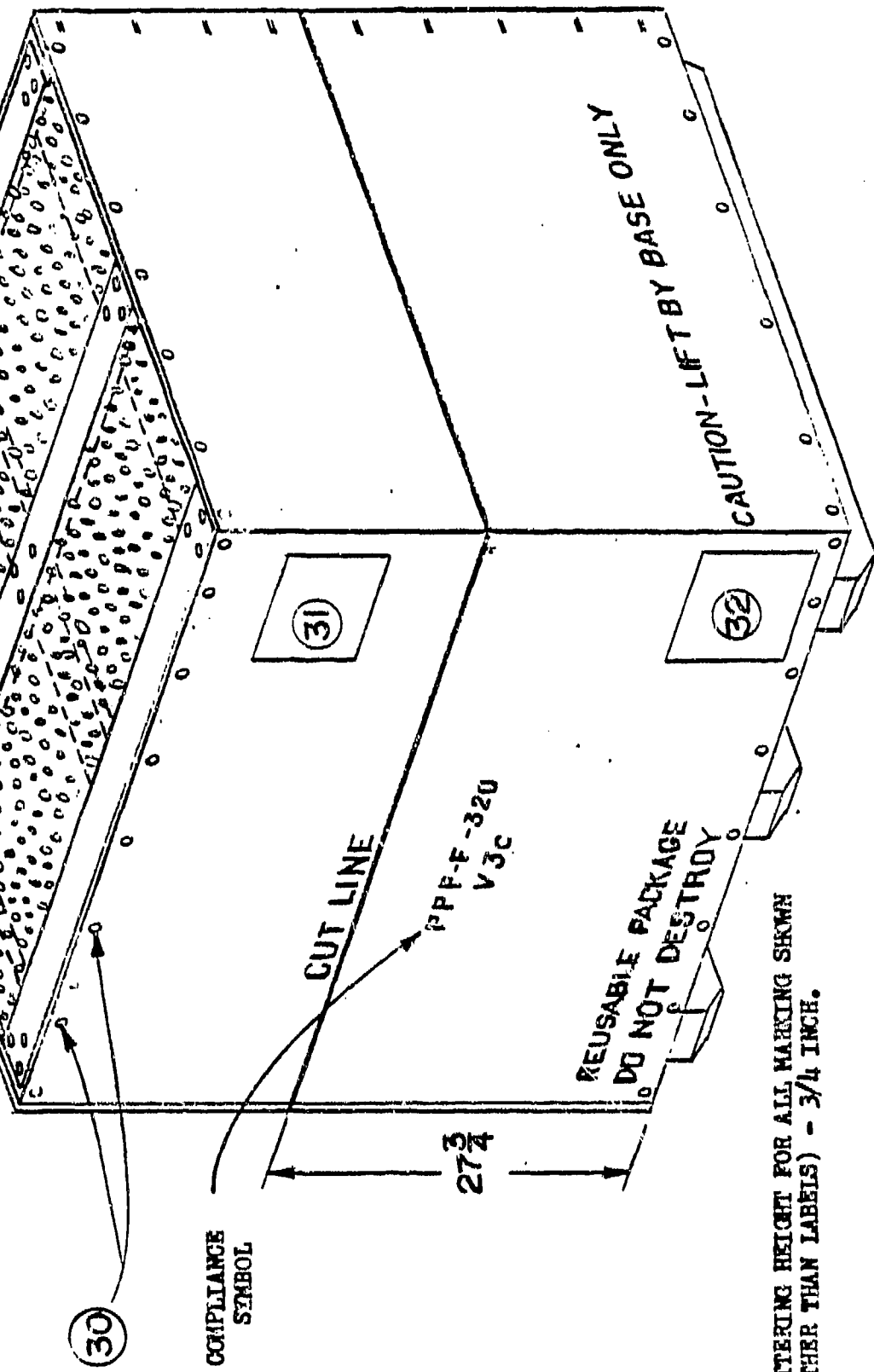
PACKAGING LEVEL

A B C

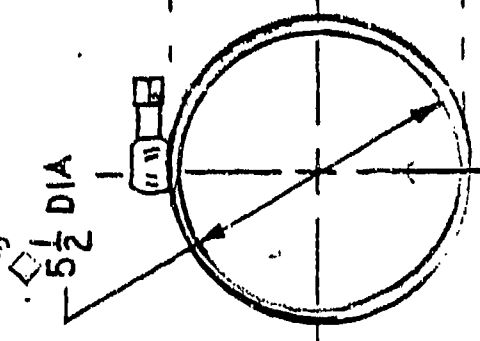
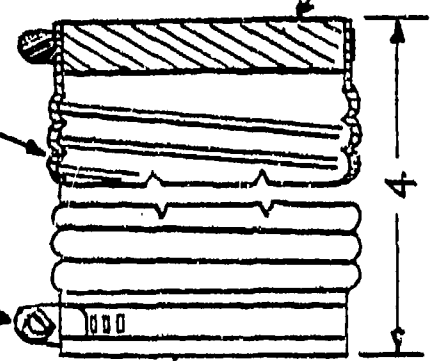
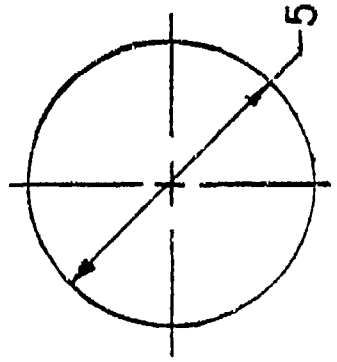



PACKAGING DATA SHEET (Continued) (AMCR 745-2)	SHEET 21 OF 27 SHEETS	PART NO. 8738127	FEDERAL STOCK NO. 2815-054-0244	PACKAGING LEVEL		
				A	B	C

LINE IDENTIFIED AS "CUTLINE" SHALL BE ONE CONTINUOUS LINE MARKED AROUND THE PERIMETER OF CONTAINER, 1/16 TO 1/8 INCH WIDE. THE CUTLINE SHALL BE LOCATED 27 3/4 INCHES FROM THE BOTTOM OF THE BASE DECKBOARD.



LETTERING HEIGHT FOR ALL MARKING SHOWN (OTHER THAN LABELS) - 3/4 INCH.

PACKAGING DATA SHEET (continuation)	SHEET 22	OF SHEETS 27	PART NUMBER 8738127	FEDERAL STOCK NUMBER 2815-054-0244	PACKAGING LEVEL A B C
<div style="display: flex; justify-content: space-around; align-items: flex-start;"> <div style="text-align: center;">  <p>5 1/2 DIA</p> </div> <div style="text-align: center;">  <p>4</p> <p>DETAIL A SEE NOTE 2</p> </div> </div> <p>CLAMP - 2 REQD SEE NOTE 3</p> <p>SEE NOTE 1</p>					
<p>NOTES:</p> <ol style="list-style-type: none"> HOSE FLEXIBLE TO BE MADE FROM MATERIAL CONFORMING TO MIL-H-52079 OR EQUIVALENT. PLUG TO BE MADE FROM 1 INCH PLYWOOD, NN-P-530, STD. INT. WITH EXT. GLUE. USE MS35842-16 OR EQUIVALENT CLAMPS. 					
<div style="display: flex; justify-content: space-around; align-items: center;"> <div style="text-align: center;">  <p>5 1/2 DIA</p> </div> <div style="text-align: center;">  <p>5 1/2 DIA</p> </div> </div> <p>DETAIL A-1 REQD.</p>					

BOOT AIR RESTRICTOR

STA FORM 5426 (One-Time)
10 Mar 71

PACKAGING DATA SHEET (Continued) (AMCR 746-2)	SHEET 23 OF 27 SHEETS	PART NO. 8738127	FEDERAL STOCK NO. 2815-054-0244	PACKAGING LEVEL <input type="checkbox"/> A <input type="checkbox"/> B <input checked="" type="checkbox"/> C

OPENING INSTRUCTION LABEL: LABEL SIZE, LETTERING SIZE, MATERIALS USED AND APPLICATION SHALL BE IN ACCORDANCE WITH MIL-STD-129.

OPENING INSTRUCTIONS:

1. CONTAINER SHALL BE OPENED BY CUTTING ALONG "CUTLINE" USING EITHER OF THE FOLLOWING METHODS:

A. MAKE INITIAL CUT WITH PORTABLE POWER SAW WITH BLADE SET AT 1 INCH DEPTH. CUT THROUGH THE REMAINDER OF THE POLYURETHANE FOAM WITH A HAND SAW OR LONG BLADE KNIFE.

B. USE A HAND SAW, PREFERABLY RIP TYPE, MEDIUM BLADE.

2. USING EITHER METHOD, THE CUT SHALL BE CONTINUOUS AROUND THE PERIMETER OF THE CONTAINER. WHEN USING A HAND SAW, CUT THROUGH THE CONTAINER SHELL AND INTO THE FOAM USING A SABRE SAW CUTTING TECHNIQUE UNTIL THE BLADE REACHES THE PROTECTIVE SLEEVE. (CAUTION: DO NOT JAM BLADE THROUGH SLEEVE AS ITEM MAY RECEIVE DAMAGE).

3. AFTER CUTTING, REMOVE TOP HALF OF CONTAINER. TO FACILITATE REMOVAL, TWO FLAT-STEEL STRIPS OR ANGLE IRONS 3 INCHES WIDE AND OF SUFFICIENT LENGTH TO EXTEND A MINIMUM OF 12 INCHES BEYOND THE ENDS OF THE CONTAINER SHOULD BE INSERTED INTO THE CUT ALONG THE ENDS TO EFFECT THE INITIAL SEPARATION. EXERT PRESSURE AT BOTH ENDS SIMULTANEOUSLY.

4. REMOVE TOP ITEM FROM LOWER HALF OF CONTAINER EXERCISING CAUTION NOT TO FRACTURE THE FOAM.

PACKAGING DATA SHEET (Continued) (AMCR 7-5-2)	SHEET OF SHEETS 24 27	PART NO. 8738127	FEDERAL STOCK NO. 2815-054-0244	PACKAGING LEVEL		
				<input type="checkbox"/> A	<input type="checkbox"/> B	<input checked="" type="checkbox"/> C

REUSABILITY INSTRUCTION LABEL: LABEL SIZE, LETTERING SIZE, MATERIALS USED AND APPLICATION SHALL BE IN ACCORDANCE WITH MIL-STD-129.

INFORMATION TO BE SHOWN ON LABEL:

REUSABILITY INSTRUCTIONS --- CONTAINER SHALL BE REUSED FOR SHIPMENT OF ITEM, FSN 2540-054-0244 SCHEDULED FOR REPAIR OR REBUILD. PREPARE FOR SHIPMENT AS FOLLOWS:

1. DRILL 2 HOLES 1/4-3/8 INCH DIAMETER THROUGH THE POLYURETHANE AND CONTAINER BASE TO PERMIT DRAINAGE OF ANY ENTRAPPED MOISTURE. HOLES WILL BE LOCATED AT THE LOWEST POINTS IN THE BASE SECTION CAVITY. DRILL HOLES IN AREAS THAT ITEM WILL NOT COVER WHEN IT IS PLACED IN THE CONTAINER.
2. PLACE ITEM IN CAVITY OF BOTTOM SECTION OF CONTAINER.
3. POSITION TOP SECTION OF CONTAINER OVER ITEM.

CAUTION: FILL VOID AREAS WITH CELLULOSE WADDING, FSN 8135-00-855-6969. IF LARGE VOIDS EXIST DUE TO FOAM REMOVAL AND CONTAINER IS NOT SUITABLE FOR SHIPMENT, DO NOT REUSE.

4. APPLY TAPE FSN 8135-00-269-8090 AROUND PERIMETER OF CONTAINER WHERE TOP AND BOTTOM SECTIONS JOIN.
5. SECURE TOP TO BOTTOM BY PLACING TWO STEEL STRAPS, FSN 8135-00-281-4069, AROUND SIDES, TOP AND BOTTOM OF CONTAINER, POSITIONED ADJACENT TO INSIDE EDGE OF SKIDS. TIGHTEN STRAPS AND SECURE WITH STRAP SEALS, FSN 8135-00-239-5293.
6. REMOVE OR OBLITERATE OBSOLETE MARKING AND APPLY APPROPRIATE MARKING.

PACKAGING DATA SHEET (Continued) (AMCR 746-2)	SHEET OF SHEETS 25 OF 27	PART NO. 8738127	FEDERAL STOCK NO. 2815-054-0244	PACKAGING LEVEL A B C
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QUALITY ASSURANCE PROVISIONS

PRIOR TO PRODUCTION PACKAGING, ONE TRANSMISSION ASSEMBLY SHALL BE CLEANED, PRESERVED, PACKAGED AND MARKED IN ACCORDANCE WITH THE REQUIREMENTS SPECIFIED ON SHEETS 1 THROUGH 24 AND BE SUBJECTED TO ALL TESTS AND EXAMINATIONS UNDER A, B AND C BELOW:

A. TESTS.

- (1) EDGEWISE DROP (ROTATIONAL) TEST. (REFER TO TEST METHOD 5008, FED, TEST METHOD STD. NO. 101 FOR PROCEDURES).
 - (a) DROP HEIGHT: 12 INCHES.
 - (b) NUMBER OF DROPS: 2 DROPS ON EACH END.
- (2) INCLINE-IMPACT TEST. (REFER TO TEST METHOD 5023, FED, TEST METHOD STD. NO. 101 FOR PROCEDURE).
 - (a) INCLINE-SETTING: 2.5 FEET.
 - (b) NUMBER OF IMPACTS: 1 IMPACT ON EACH END.
- (3) CORNERWISE DROP TEST (TEST METHOD, 5005, IN ACCORDANCE WITH FEDERAL TEST METHOD STANDARD NO. 101).
 - (a) DROP HEIGHT: 12 INCHES.
 - (b) NUMBER OF DROPS: 2 DROPS ON EACH OF 2 DIAGONALLY OPPOSITE CORNERS OF BOTTOM.

NOTE: PACKAGE SHALL NOT BE TESTED PRIOR TO 48 HOURS AFTER FINAL POURING OF THE POLYURETHANE FOAM. TEST SHALL BE CONDUCTED IN THE FOLLOWING SEQUENCE: EDGEWISE DROP, CORNERWISE DROP, AND INCLINE-IMPACT TEST. (PENDULUM IMPACT TEST, TEST METHOD 5012 OF FEDERAL TEST METHOD STANDARD NO. 101 MAY BE SUBSTITUTED FOR THE INCLINE-IMPACT TEST. PENDULUM IMPACT: 5 INCHES; NUMBER OF IMPACTS: 1 IMPACT ON EACH END).

PACKAGING DATA SHEET (Continued) (AMC 1029A-1)	SHEET 26 OF 27	PART NO. 8738127	FEDERAL STOCK NO. 2815-054-0244	PACKAGING LEVEL		
				A	B	C

B. EXAMINATIONS (FOLLOWING TESTS).

- (1) THE EXTERIOR SURFACES OF THE PACKAGE SHALL BE EXAMINED. THERE SHALL BE NO EVIDENCE OF SEPARATION OF THE CONTAINER SHELL, BASE OR TOP FRAME FROM THE POLYURETHANE FOAM. THE CONTAINER BASE SHALL BE INTACT WITH NO SPLITS OR BREAKS IN THE PLYWOOD AND NO LOOSENESS OR THE SKIDS.
 - (2) THE PACKAGE SHALL BE OPENED IN ACCORDANCE WITH THE OPENING INSTRUCTIONS. THE TOP AND BOTTOM SECTIONS SHALL BE EXAMINED FOR FRACTURES (CRACKS OR SPLITS) RESULTING FROM THE TESTS. THERE SHALL BE NO FRACTURES IN THE POLYURETHANE FOAM. THE ITEM SHALL BE REMOVED AND THE CAVITY WALLS EXAMINED FOR VOIDS BETWEEN THE WRAP AND FOAM. THE SURFACE OF THE CAVITY WALLS SHALL BE SOLID. THE FIBERBOARD SHELL SHALL BE REMOVED FROM THE POLYURETHANE FOAM AND THE EXTERIOR SURFACES EXAMINED FOR VOID AREAS. THESE SURFACES SHALL BE SOLID.
 - (3) A SAMPLE BLOCK SHALL BE CUT FROM THE FOAM PACK, TRIMMED TO PROVIDE PLANE SURFACES TO A SIZE OF 6 X 6 X 3 INCHES. THE 3 INCH DIMENSION SHALL BE IN THE DIRECTION OF THE FOAM RISE. THE BLOCK SHALL BE EXAMINED FOR BLOW HOLES. BLOW HOLES SHALL NOT BE LARGER THAN 1/2 INCH, LARGEST DIMENSION, AND NOT MORE THAN ONE BLOW HOLE SHALL OCCUR ON EITHER SURFACE OF THE 6 X 6 INCH DIMENSIONAL AREA. THE SAMPLE BLOCK SHALL THEN BE SLICED PERPENDICULAR TO THE DIRECTION OF THE FOAM RISE IN THREE 1 INCH THICK LAYERS. NOT MORE THAN THREE BLOW HOLES SHALL BE PRESENT IN THREE ADJACENT ONE INCH THICK LAYERS.
 - (4) THE CURED FOAM SHALL BE FREE OF NONFOAMED OR SOFT AND TACKY PARTICLES.
 - (5) THERE SHALL BE NO FOAM PENETRATION THROUGH THE WRAPS.
- C. EXAMINATIONS.
- (1) DETERMINATION OF CLEANLINESS OF THE ITEM.
 - (2) INTERNAL, EXTERNAL PRESERVATION PROPERLY ACCOMPLISHED.
 - (3) DESIGNATED WRAPS, SLEEVE AND PADS PROPERLY APPLIED.
 - (4) REQUIRED CONTAINER COMPONENTS USED, FABRICATED AND ASSEMBLED PROPERLY.
 - (5) DESIGNATED PREFABRICATED BLOCKS, PROPERLY POSITIONED.
 - (6) PROPER POSITIONING OF ITEM WITHIN CONTAINER.

1735-1

PACKAGING DATA SHEET (Continued) (AMSR 746-3)	SHEET 27 OF 27 SHEETS	PART NO. 8738127	FEDERAL STOCK NO. 2815-054-0244	PACKAGING LEVEL		
				A	B	C

(7) DETERMINATION OF DIMENSIONAL STABILITY.

(8) DESIGNATED MARKINGS PROPERLY APPLIED.

(9) POLYURETHANE FOAM APPLICATION IN ACCORDANCE WITH MANUFACTURER'S INSTRUCTIONS.

ONLY ONE UNIT NEED BE SUBJECTED TO THE TESTS IDENTIFIED UNDER A ABOVE AND EXAMINATIONS, B, ABOVE PROVIDED:

(1) THE UNIT IS ACCEPTABLE BASED ON THE CRITERIA ESTABLISHED.

(2) NO CHANGES ARE MADE IN PROCEDURES, TECHNIQUES OR MATERIALS THAT WILL AFFECT THE ACCEPTABILITY OF THE PRODUCT DURING PRODUCTION.

SHOULD THE FIRST UNIT FAIL OR SHOULD ANY CHANGES AS STATED ABOVE BE EFFECTED, ADDITIONAL UNIT(S) WILL BE RETESTED AND EXAMINED UNTIL AN ACCEPTABLE UNIT IS PRODUCED.

EXAMINATIONS IDENTIFIED UNDER C ABOVE ARE QUALITY CONFORMANCE EXAMINATIONS. QUALITY CONFORMANCE INSPECTIONS SHALL BE CONDUCTED ON A SAMPLING BASIS IN ACCORDANCE WITH THE PROCEDURES ESTABLISHED IN SPECIFICATION MIL-P-116. SAMPLE SELECTION, INSPECTION LEVEL AND A.Q.L. SHALL BE AS SPECIFIED IN PARAGRAPH 4.2.2.3.1, MIL-P-116.

(SEE PARAGRAPH 4.2.2.4 FOR QUALITY CONTROL PROGRAM OR INSPECTION SYSTEM REQUIREMENTS, IF APPLICABLE).

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